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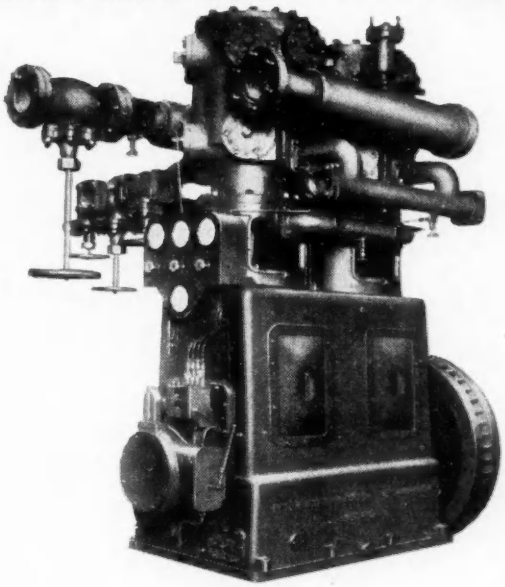

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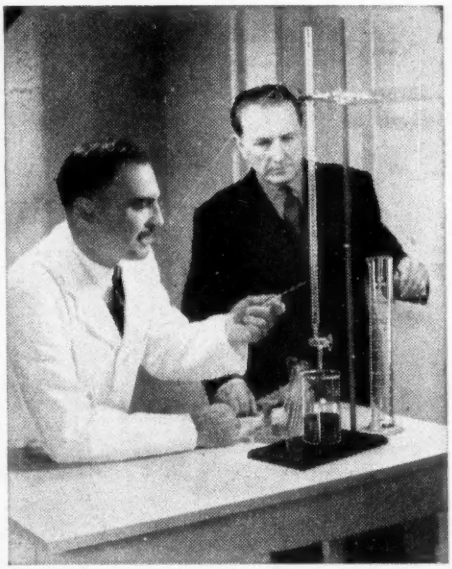

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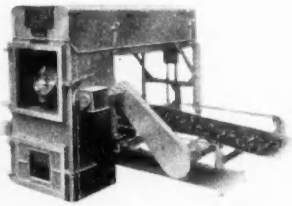

The "Adequate" Weigher shown with recorder doors closed.

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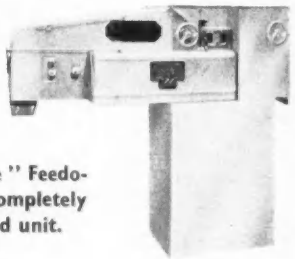

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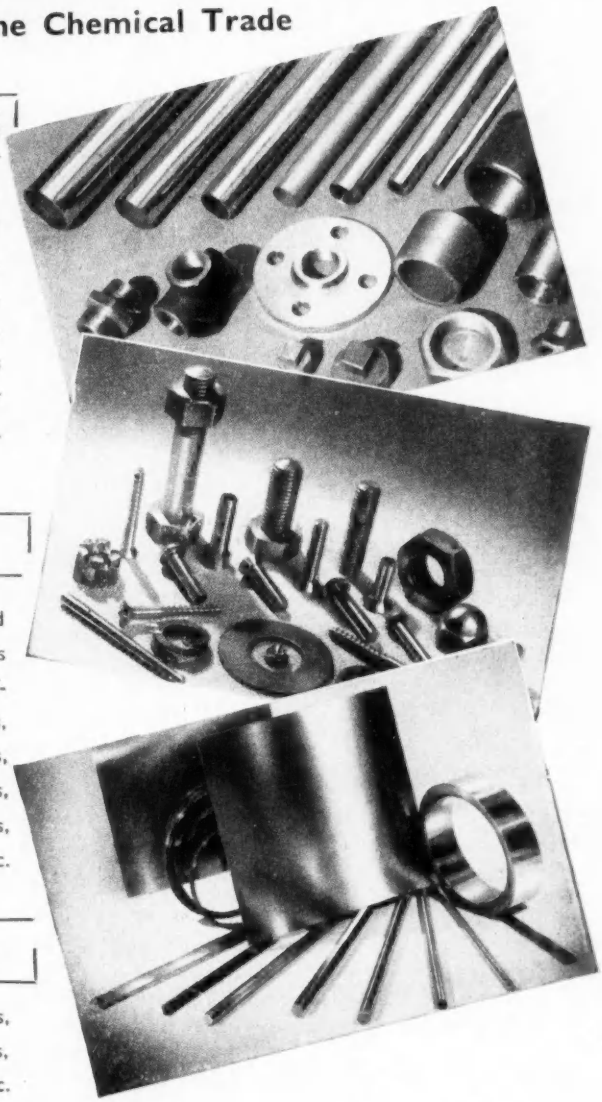

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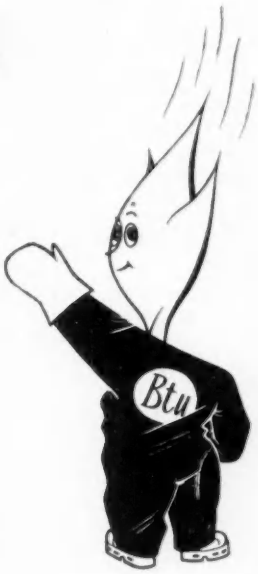

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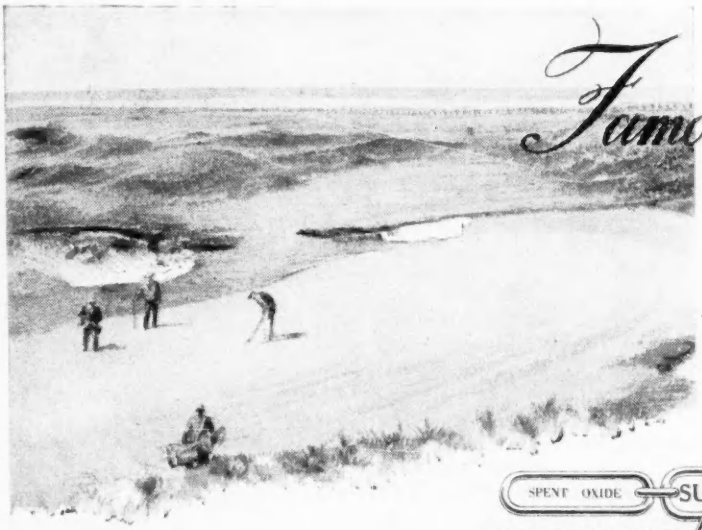

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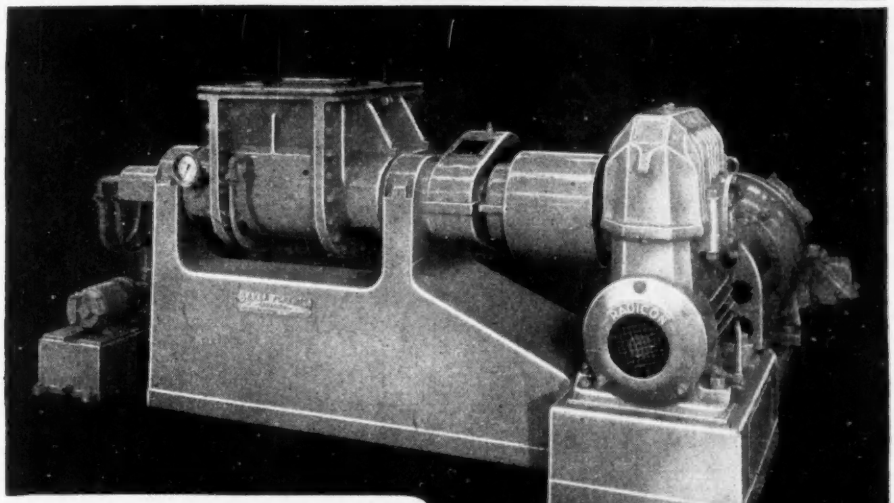

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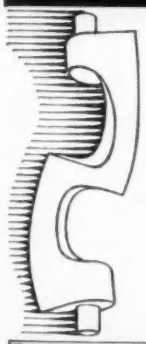

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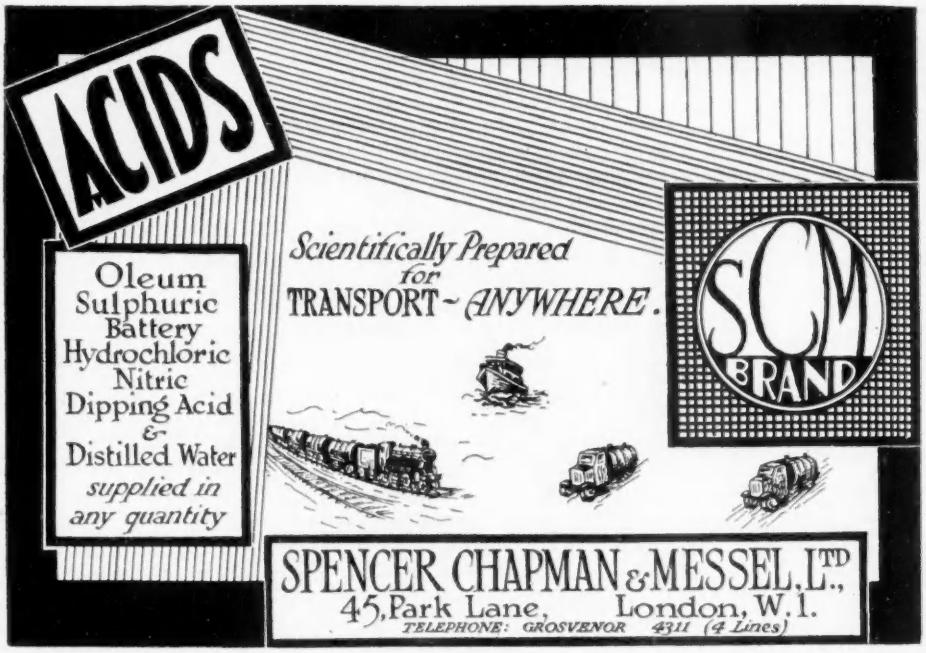
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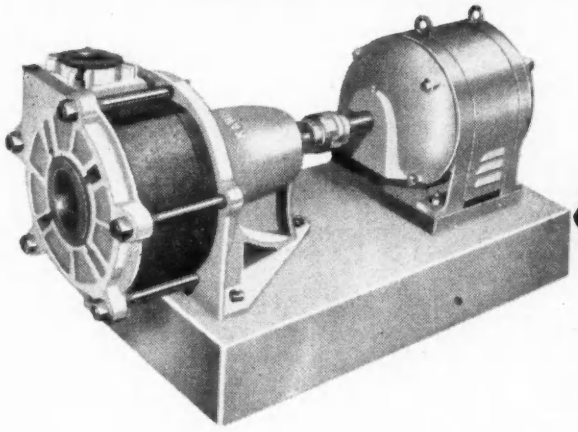

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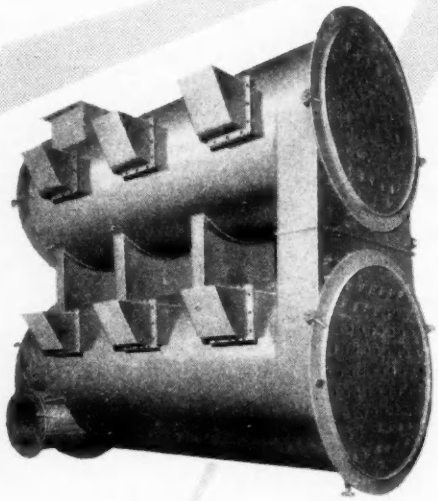

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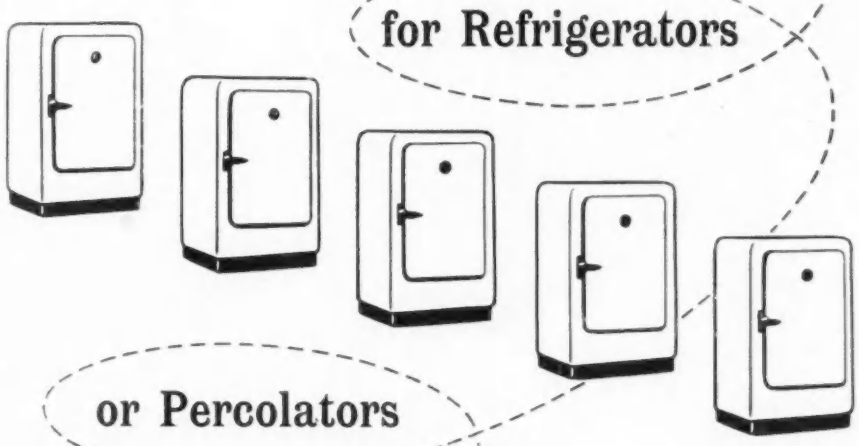

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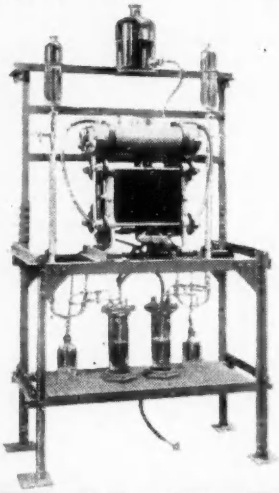

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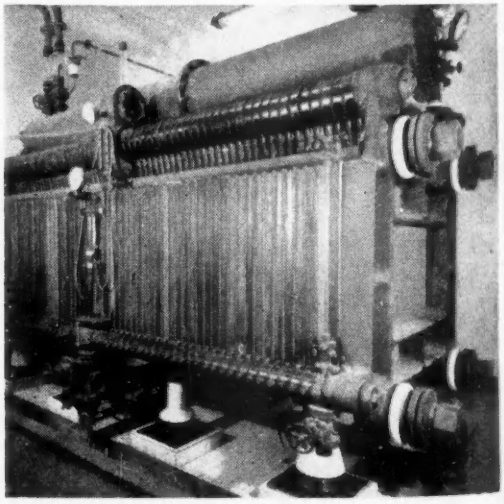

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Established 1919

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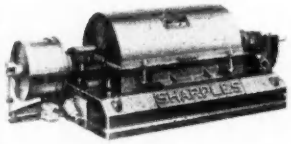

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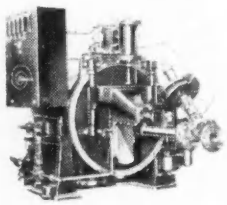

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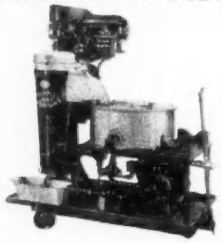
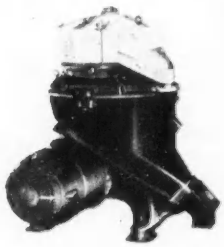


SUPER CENTRIFUGE. For high efficiency clarification of liquids containing solids or for separation of two immiscible liquids. Bulletin No. 551L.



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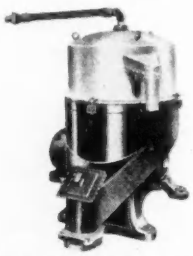

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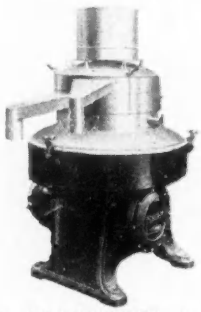

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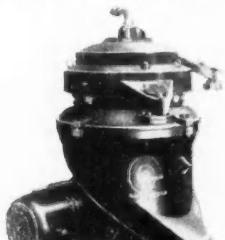

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Glass for Strength?

MORE attention might well be devoted to one of the newest constructional materials of our time—the combination of glass fibres and synthetic resins that is now known generically as Glass Reinforced Plastics. As a partnership of antiquity and modernity, the material will prove hard to beat in historical records for glass fibres were first used some 3,500 years ago by the Egyptians; indeed, glass in fibre form pre-dates glass in either blown or sheet form by over 1,000 years. However, the industrial usage of glass fibres, as distinct from decorative and artistic use, is still fairly youthful; the first employment, as a heat-insulant, is only about 30 years old. During recent years factories to produce glass fibres have entered the pattern of industry in most modern countries. The realisation that glass fibre has a tensile strength at least as great as that of steel is perhaps the main factor stimulating its modern rediscovery.

Synthetic resins are, of course, much younger, though in the industrial sense their development precedes that of glass fibres. The attempts to produce strong materials by reinforcing synthetic resins with other material started in 1907 when Baekeland produced a composite of vegetable fibres and phenolic resin. It was not particularly successful, for the vegetable fibres absorbed moisture too readily, and this caused them to swell and rupture the resin bonds. The need for a better type of fibre was quickly appreciated and the possibility of using glass for this purpose was not ignored. But such heavy pressure was then needed for moulding that the minute fibres crushed under its force. Yet high pressure could not be avoided, as without it the steam released by the resins produced bubbles and made the resin-fibre mixture porous. For a reinforced glass-fibre plastic substance to be possible, new resins that did not evolve water in the heat of processing were required. They were not available until some 10 years ago. Today there are a number of suitable synthetic resins, the polyester series, the furanes, the epoxy resins, and even the silicones. These resins in their 'unreacted' or pre-set state can flow readily round each minute glass fibre; under the action of heat and catalysts, the resin molecules polymerise and cross-link together in long chains, binding the enclosed glass fibres into a strong, interlocked structure. The glass fibres are generally introduced in the form of a mat or feltlike cloth.

This new constructional material varies in its properties according to formulation. However, a range within which properties generally fall can be indicated. Its specific tensile strength can vary from 12,000 to 30,000 pounds per square inch; this compares with figures of about 9,000 for steel and 4,000 to 14,000 for aluminium. For any given tensile strength there is no rigid material as light as glass reinforced plastics. Chemical resistance is fairly good and temperatures up to about 150° C can be met; the use of special resins allows the maximum temperature to be raised to about 200° C. Glass reinforced plastics are mouldable without the use of heat or pressure, but production speed may be too slow if some heat or pressure is not employed. The resistance of the material to impact force is remarkably high—it does not even dent.

D

It may seem remarkable that a new material of such virtue and versatility is not already more widely known and used. However, there are restrictive factors and it remains to be seen in the next few years whether they are due to the growing pains of a new and major material or whether they will persist as disadvantages that must always be brought into balance with the advantages. Cost is trouble number one. The raw material cost per pound exceeds that of metals. Unless an utilisation project can offset this price disparity by using much less weight of material to achieve sufficient rigid strength, the final article made must be dearer than its conventional metal-made article. There is also the possibility of saving manufacturing labour through the easy mouldability of glass reinforced plastics, and this, too, may often assist in overcoming the initial price problem. However, it is already a partially eased problem. Four years ago the cheapest glass fibre reinforcement material was costing 15s. per pound, and this has steadily fallen to a price of 5s. per pound at the present time. The resin prices have also fallen in recent years. How much farther can these basic prices be reduced?

Other difficulties still facing large-scale utilisation are associated with the properties of glass reinforced plastics. In its moulded forms it is generally less stiff than steel or alloys of the same shape. Orientation of the glass fibre reinforcement is sometimes needed to give extra stiffness in a required direction. However, many articles are shaped with double curvature and with these the necessary stiffness or fixed rigidity is usually obtained with the ordinary glass reinforced plastics. However, this is at present a constructional deficiency that must be considered and must inevitably limit the purposes to which the material can be put. It has not discouraged one well-known British company from starting a project to make piping from glass reinforced plastics; successful development of this would probably accelerate the use of the material in the chemical industry. The curing time in manufacture is still too long; the reinforced plastic takes several minutes to 'set' and for mass production at a lower cost an appreciable reduction in this time is badly needed. Another disadvantage, though not a considerable one in many circumstances, is that the material is not fireproof. The glass content acts as a flame retarder but the resin content is combustible. The introduction of certain fillers can make the material self-extinguishing, but this does not assist the cause of price reduction.

The already developed uses of the material may give useful guidance to the potentialities of the future. Boats up to 25 feet in length are in regular production. Here, of course, strength and resistance to impact combined with lightness give the material particularly good advantages. Cars and motor-cycles have been made from it; crash helmets and the familiar 'Dodgem' cars of fun-fairs have been made from the glass-resin laminate. Train compartment and bus construction companies are using it for making a variety of panels previously constructed from metal alloys. Such goods as corrugated roof lights, road signs and Belisha beacons, fishing rods, golf clubs, whips and archery bows, and cafeteria equipment are other uses. The number of firms that have recently staked a direct interest in the future market for glass reinforced fibre is perhaps the clearest sign that most of the future for this new material has yet to be unfolded.

As a composite made from glass and synthetic resins, it is, of course, a chemical product, made possible only by twentieth-century chemistry. Regarded, however, as a product of the separate glass and plastics industries, it is a material for the chemical industry to consider for various constructional purposes. Its lightness and mouldability and resistance to corrosion may in many cases outweigh the relative lack of stiffness and the problem of fire-risk. This is an age of new materials and their pace of innovation seems at times too fast for proper relative appraisal. A new constructional material that can be almost entirely made from cheap home-based minerals and home-producible synthetic chemicals seems unlikely to face long difficulties in finding full employment.

Notes & Comments

Handling HF

THE increasing number of modern processes that involve aqueous hydrofluoric acid has produced a new corrosion problem. The fact that Monel metal and copper-nickel alloys offer extremely good resistance when completely immersed in the aqueous acid can be somewhat misleading as an indication of expectable plant or pipeline life. Resistance is considerably lessened where a liquid level line is involved; then severe attack can take place. This is also the case at points where alternate evaporation and condensation of vapour containing oxygen occurs. On the principle that a chain is as strong as its weakest link, any vessel or pipeline in which the metal-liquid contact can produce either of these conditions at one point or another will have a seriously shortened service life. These hard facts emerge from a recent American study (M. Schussler, *Industrial & Engineering Chemistry*, 1955, **47**, 133), and, unfortunately, they are not yet accompanied by convincing solutions or remedies. As the paper itself states: 'It is doubtful whether any industrial HF application can be regarded as involving the ideal exposure conditions of a quiet bath and total immersion.'

Silver-Brazed Joints

IT seems rather impractical to recommend that plant metal surfaces should be kept continuously immersed by keeping the system full at all times, or to exclude oxygen by using O-free nitrogen or by maintaining an internal pressure higher than atmospheric pressure. Can processing requirements or plant design hope to maintain such rigorous conditions? Another suggestion in the paper seems much preferable—that the points where these attack-promoting conditions are likely to be encountered should be localised areas of the system. Even so, the only metal that showed superior resistance to liquid level line attack was pure silver; however, there is an indication that at sufficiently low temperatures impervious graphite or certain plastics may offer the best service. Illium and lead were tested and both proved disappointingly unequal to the ordeal, Illium being fairly readily corroded even under ideal conditions of total immersion. Past experience in HF processes has shown that leaks develop most commonly at joints. Silver-brazed joints with long lap lengths and with meticulous freedom from crevices or sheared edges on the base metal provide the surest solution to this problem. The brazing alloy must have a high silver content, as much as 70 per cent.

New Insecticide Development ?

THE employment of certain chemicals as systemic insecticides is now well known and established. It seems a considerable jump to try using livestock pest insecticides as systemics within the bodies of cattle! Nevertheless, this has been done during the past two years with some success (*Agricultural Chemicals*, 1955, **10** [1], 34). The three insecticides used were dieldrin, aldrin, and gamma-BHC (or lindane), and the principal test-insect was the screw-worm whose larvae feed on living tissues in the animal. Application was by subcutaneous injection; oral application was found to be impossible, for the test yearling Hereford cattle given doses of the insecticides by mouth died within five hours. The amount of insecticide needed to establish a toxic and systemic effect on grub larvae approaches the amount that is lethal when orally consumed. Even in the injection tests, one yearling cow died after its second dose of aldrin, though this was the only case among many. Is it going too far along the toxic chemical path to attempt to put sublethal concentrations into animal bodies in order to protect them against pests?

Limited Success

THE actual results so far as pest control is concerned seem to have been somewhat limited. Injection at monthly intervals—which is as much as cattle can stand!—renders them insecticidal in the periods between. However,

effectiveness is greatest when injection is made after grub infestation, i.e., grubs already *in situ* are more likely to be killed than later invaders to be repelled. This seems to suggest that any development of systemic insecticides for cattle should take the form of curative treatment rather than of general and preventive treatment. This is also the humane approach for it might be justifiable to risk adverse effects upon an animal's health if it is already suffering grievously from established pest infestation.

Better Abandoned

ALSO, of course, there is the question of toxic residues, and these particular chlorinated insecticides are more persistent than those whose systemic use has been permitted for plants. There is no point in controlling pests if finally the meat must be condemned because it is contaminated with insecticide. Four months after injections, large residues of aldrin and dieldrin (188 and 69 ppm. respectively) remained in the animal fat; gamma-BHC, however, had been largely lost, there being only 2 ppm. in the fat after four months although after one month there were still 54 ppm. It seems certain, therefore, that any development of this new use of insecticides will have to be limited to the less persistent gamma-BHC. But we cannot help feeling that on the whole this is a chemical venture that interferes too grossly with natural complexities and would be better abandoned.

Food & Clothing

Principal Jobs of Chemical Industry

EVEN though 1,000,000,000 persons in the world wear very little clothing and 300,000,000 scarcely bother with clothes at all, the chemical industry has a vast opportunity of expanding its production of inexpensive synthetic fibres. But with an annual increase in the world family of 40,000,000 mouths a year, the industry's first task is to help increase the food supply.

These are among the principal findings in the *Outlook for the Chemical Industries* section of the general report prepared for the government, employer and worker delegates of 21 nations attending the fourth session of the International Labour Organisation's Chemical Industries Committee which opened at Geneva on 7 February.

The ILO, referring to findings of the United Nations Food and Agriculture Organisation, reported that the No. 1 job of the chemical industries is to provide an adequate food supply in a world where one-half of the present production of synthetic fertilisers is consumed in Europe and one-third in North America. This leaves only one-sixth for all the rest of the world including those regions where hunger and even famine are an ever-present dread.

The synthetic fibre industry is another sector of the chemical industries which feels a substantial impact of the increasing world population, according to the report.

Chemical products are now of importance in a large number of other fields including the building and furnishing trades, hygiene and health and many industrial processes where plastics are superseding steel, aluminium and copper, or are used in conjunction with them.

Owing to the introduction of automatic apparatus and the mechanisation of the industry, the number of workers in the chemical industries increases more slowly than in other industries.

The Chemical Industries Committee will also discuss factors affecting productivity with special reference to work study and systems of wage payment.

Atoms for Industry

SOME of the newest ways in which atomic energy is being harnessed for industry will be demonstrated in Birmingham from 14 to 16 February when a special exhibition is being held at the Birmingham Exchange and Engineering Centre. Experts from the Isotope Division of the Atomic Energy Research Establishment at Harwell have devised the exhibition, and a number of industrial firms who manufacture equipment for work with radioactive isotopes will also be taking part.

The exhibition will be opened on 14 February by Dr. Henry Seligman, Director of the Isotopes Division. It will be open from 9 a.m. to 5 p.m. daily.

Tanning & Dyeing

Meeting of Manchester Leather Chemists

AT a meeting of the Manchester Group of the Society of Leather Trades' Chemists on 29 January at the Reynolds Hall in the College of Technology, Manchester, two papers were read and discussed.

The first was 'The Quantitative Assessment of the Properties of Vegetable Tanning Liquors and Extracts' by Professor D. Burton.

A scheme for the quantitative definition of the properties of tan liquors is urgently required. The ratio, 1,000:(total salts of weak acids to *p*H 2.0) is regarded as an astringency value. Results for 15 tanning materials follow the same order as the generally accepted order of astringency. The ratio (total salts of weak acids to *p*H 2.0): (total acidity to *p*H 5.8) is not a measure of astringency but differentiates pyrogallol and catechol tannins.

Great care is necessary in devising a method for measuring the plumping power because surface de'imed pelt is involved. It is mainly dependent on the *p*H value but the salts present may reduce it by their osmotic effect. Molecular weights given by the cryoscopic method, gelatin numbers and the decrease in the acid binding capacity of hide-powder when tannin molecules combine with its amino groups, only give a measure of the average particle sizes. The electron microscope shows that these vary very greatly in any one liquor.

Nine Tanning Materials

Further work was described with the dialysis method and preliminary results given for the tanning acids, non-tanning or natural acids, salts of tanning acids and salts of non-tanning acids in liquors prepared from nine tanning materials. Algarobilla and tara contain more tanning acids than myrobalans. Nearly the whole of the acidity in Sicilian sumach is due to non-tanning acids. *Pistacia lentiscus*, a sumach adulterant, contains a considerable quantity of tanning acids and more non-tanning acids. Dhawa, country sumach, contains about 15 times as much tanning acids as sumach. Sant grains and gambier contain similar concentrations of tanning and non-tanning acids. The salts of the tanning acids are being investigated. The acidification of tan liquor was also discussed.

This paper was followed by 'The Fastness of Dyestuffs on Leather' by F. P. Russell and T. C. Mullen.

The present lack of information on the fastness properties of dyestuffs on leather was pointed out, the work reviewed being designed to investigate the effect on fastness of some variations in processing.

Standards of Fastness

The standards of fastness required for various types of leathers were first discussed. For example, it was pointed out that in the case of a pigmented leather, the light fastness of the dyestuffs used is of no importance, whereas a suede leather depends entirely on the dyestuffs for its colour and the light fastness in this case is of considerable importance. Various existing types of dyestuff were then considered and it was pointed out that though in some cases a class of dyestuff may exhibit a uniform standard of fastness, in most cases each individual member of the range has to be examined in detail. Thus basic colours in general have poor light fastness, chrome colours generally have good wash fastness, but in the acid and direct types, the different members have widely varying properties.

Fastness to light of various tannages was then examined; and it was shown that as a class the vegetable tannins are characterised by poor light fastness. These leathers were then dyed with four acid dyestuffs, the fastness properties of which were known to vary from poor to excellent, and it was found that a tannage which has poor light fastness gives a dyeing which quickly fades, even with a dyestuff which is fast to light.

A suitable method of assessing wash fastness was described and it was shown that vegetable tannages yield dyeings of poor wash fastness. The fastness of dyeings 'topped' with basic dyestuffs was also examined. Topping a fast acid dyestuff reduces the wash fastness, but in the case of an acid dyestuff which has low fastness, no effect was observed.

The effect on light and wash fastness of an increasing proportion of levelling agent was

shown to be adverse in some cases. The use of cationic agents, both before and after dyeing with acid dyestuffs, was assessed, and in general, was found to have no effect on either washing or light fastness, though in a few cases slight improvement was shown. A further series of dyeings, using excess formic acid for exhaustion, were found to exhibit the normal wash fastness. It was also shown that diazotising and developing gives variable results in that the developed dyestuffs in some cases showed an improvement in wash fastness, whereas in other cases no change was observed.

It was pointed out that where good fastness was required, tannage as well as dyestuff must be considered. The lack of standard methods of assessment was stressed and it was urged that standards of fastness must be established for use by the leather trade. It was suggested that a series of simple tests should be set up which could be used by all classes of the trade as a basis of assessment and comparison.

Sunburn Research

Preventing Plastics Degradation

EXPOSURE to ultra-violet light in the presence of oxygen can produce a considerable amount of degradation—as those of us who too unwisely take advantage of the rare days of summer sunshine are aware. The effects of similar conditions on plastics materials have been the subject of much research, some of which was described in this journal recently (THE CHEMICAL AGE, 1955, **72**, 149), and as a result a number of compounds have been developed which play very much the same part in the prevention of plastic degradation as do suntan creams in the prevention of sunburn.

Some literature which we have recently received from Cyanamid Products Ltd. describes three UV absorbers which have been developed in the US for incorporation in plastics. Generally speaking these substances are suitable for use in cellulose, ethylcellulose, styrene, and vinyl polymers and copolymers, and polyesters, although not in polythene. They cause little or no change in optical properties in the visible range, and they have a low toxicity under normal conditions of handling. Tests of their capabilities were made in the most degrading conditions the Americans could find—a Florida summer.

The three compounds, which have been given the respective numbers 9, 1, and 12, are 2-hydroxy-4-methoxybenzophenone, 2-hydroxy-4:4′-dimethoxybenzophenone and 2 : 2′ - dihydroxy-4:4′-dimethoxybenzophenone. They are very effective for the absorption of UV radiation, the molecule being raised to an excited level and subsequently dissipating its energy, not as fluorescence but as heat. Light in the visible part of the spectrum is practically unabsorbed.

All have a high stability to heat and light. Apart from a tendency to form strongly yellow colours in moderately alkaline conditions, they are relatively inert chemically. The yellow coloration is caused by salt formation, and provided the *p*H is kept below about 8 this causes no trouble. The most convenient method of application is to dissolve the absorber in the appropriate plasticiser before it is incorporated in the resin. Another means is to dissolve it in the monomer at any point in the polymerisation before gelling occurs; application by spraying the surfaces of articles to be protected is also effective.

Among other specific applications suggester for Cyanamid's UV absorbers are food packaging, transparent wrappers for coloured materials, waxes and polishes for light-coloured finishes, preservation of activity of pesticides, store windows and skylights, clear plastics for aircraft, glass fibre laminates, prevention of crazing and fading of rubber, and prevention of yellowing of paper. Sunburn research has gone far.

Corrosion of Buried Structures

A course of five lectures on 'Corrosion and Protective Measures for Buried and Submerged Structures' by K. A. Spencer will be held at Northampton Polytechnic, St. John Street, London E.C.1, on Monday evenings at 7 p.m., starting on 7 March. Subsequent lectures will be on 14 and 28 March, 25 April and 2 May.

Grant for Birmingham

A grant of £2,000 a year for three years has been accepted by the University of Birmingham from the Aero Research Co. for fundamental research on fluorine compounds in the Department of Chemistry.

IG Farben Freed from Allied Control

by G. ABRAHAMSON

ALLIED High Commission Law No. 49 which was promulgated on 3 February, together with four implementary regulations, transfers control over the final phase of liquidating IG Farbenindustrie to the German Federal Government. The tripartite control group which hitherto exercised all functions normally exercised by management, board of directors and shareholders' meetings on behalf of the three occupation powers is being dissolved, and the Allied deconcentration laws under which the combine has been dissolved and its properties dispersed will cease to have legal effect when new liquidators have been appointed by a shareholders' meeting to be held in April or early May. The deconcentration and liquidation measures taken under allied control will, however, remain in force. The Federal Government has recognised the segregation of IG Farbenindustrie units and undertakes to complete the liquidation. Neither shareholders nor liquidators are entitled to rescind the deconcentration, if only in part, and the liquidators must not join any of the successor companies as directors.

End of a Chapter

The transfer of control marks the end of an important chapter in the history of the German chemical industry but is not in itself of great importance. The deconcentration of IG Farbenindustrie is a fact which cannot be undone. Not only does resurrection of the combine in its previous form remain forbidden but the Federal Government has given a pledge that there will be no fusion of successor companies before the end of this year. Future mergers between successor companies would require the consent of shareholders holding at least 75 per cent of the capital. This does not of course exclude the possibility of intensified co-operation, and it is also possible that the former IG Farbenindustrie leaders, some of whom have been found guilty of war crimes, will try to return to the stage on which they played such a prominent part in the past.

The German authorities which now assume responsibility for the final liquidation of IG Farbenindustrie will not be concerned with the segregation of physical assets. The deconcentration process was largely completed in 1952/53 when shares in four of the five principal successor companies were distributed to IG Farbenindustrie shareholders. The share capital of the fifth one, Chemische Werke Hüls, which was held back as security for creditors, has now been transferred to a new holding company, Chemie-Verwaltungs-AG, which will have to satisfy such IG Farbenindustrie creditors' claims as cannot be met out of the liquidation company's remaining assets. This stipulation was necessary because the latter company's liabilities, especially to concentration camp inmates forced to work in IG Farbenindustrie factories during the war, can still not be accurately assessed. Most of the other remaining fixed assets in West Germany have been disposed of, while former IG Farbenindustrie property in the Soviet occupation zone of Germany and abroad appears in the balance-sheet at the nominal figure of one Deutschmark.

Unimpaired Efficiency

That the deconcentration carried out under Allied control (THE CHEMICAL AGE, 1954, **70**, 1147) has not impaired the industrial efficiency or financial stability of the individual groups which made up the IG Farbenindustrie combine is readily admitted in Germany. The successor companies have steadily raised their share in German chemical production, and especially in export sales, and in view of the very large sums they are investing in new plant and research, they are certain to strengthen further their pre-eminent position. In 1953 they reported total sales of DM.3,221,500,000, equal to 30 per cent of all chemical sales by West German manufacturers, and the three successors which have as yet indicated sales figures for the past year have recorded increases by between 18 and 22 per cent in 1954. The combined turnover of the five successor companies is now of about the same magnitude as that of the leading British chemical producer.

Investment expenditure in the first few years after the war was concerned entirely with the repair of war damage. Since the West German currency reform of 1948,

however, an increasing proportion of new investment has been devoted to new products, especially plastics and fibres, and to a lesser extent antibiotics, insecticides, detergents etc. Considerable capital expenditure has also been incurred in the basic sections of the industry, at first largely in order to keep the supply of basic chemicals abreast of requirements, but lately more and more for the purpose of reducing production costs. Much has been done, for instance, to develop alternative sources for synthesis gas, and oil refinery by-products and natural gas are being drawn on as additional raw materials.

Parallel Policies Pursued

In all this the successor companies have pursued parallel policies. They are spending similar amounts on plant and research —10-12 per cent of turnover on additional plant and 4-5 per cent on research, excluding new laboratories, etc. They are all playing an active part in the more promising fields of the chemical industry, notably in the production of new chemical fibres and plastics. But there is little overlapping between them. Research and development no doubt follow an integrated course, and there has been some evidence in recent years of a desire to restore the broken organisational links between some former IG Farbenindustrie units.

Nevertheless, it is doubtful whether the big successor companies would, if they were at liberty to do so, try to re-establish a closely knit and centrally directed organisation of the type of the IG Farbenindustrie combine. It is agreed that the latter was a cumbersome structure; plans for some decentralisation of the combine appear to have been prepared by German experts already before the end of the war. Experience since suggests that the individual successors are efficient production units and capable of attracting new finance. Some of the leading men in the German chemical industry are therefore definitely opposed to a refusion. Some mutual adjustment is, on the other hand, considered desirable in research, sales and investment programmes. What further organisational changes are affected will no doubt largely depend on the experience of the big successor companies in the next few years, especially their ability to withstand competitive pressure in export markets, and also on personal factors.

Trade with Turkey

THE Board of Trade announced in January that an agreement had been signed by the UK and Turkish Governments regarding a settlement of the outstanding transfers of sterling payments to UK exporters or merchants in respect of goods—apart from petroleum—imported into Turkey.

The agreement provides that the outstanding transfers will be paid by the Turkish Central Bank through a special account established with one of their banking correspondents in London in the chronological order of the dates of registration of applications made by Turkish importers for authorisations for the transfer of sterling. The Board of Trade has undertaken to prepare a list of transactions on which transfers are outstanding and exporters are invited to supply details of each shipment of goods imported into Turkey for which sterling payment has been outstanding since before 1 January 1953.

Details are also invited of goods held in Turkish customs warehouses for want of the necessary import authorisation.

New Division for Pfizer

PFIZER Ltd., who manufacture terramycin, have set up a separate Agricultural Division, which is taking over responsibility for the marketing of terramycin animal feed supplements and the antibiotic's large veterinary range.

Marketing is being carried out through millers and existing distribution services, but to help farmers make the best possible use of these important aids to animal health and growth, the company has appointed a team of agricultural advisers. Each adviser will be based in a different part of the country to provide on-the-spot contact with distributors and farmers.

Mond Nickel Fellowships

The Mond Nickel Fellowships Committee invites applications for Fellowships of an approximate value of £900 to £1,200 for 1955. Fellowships will be awarded to selected candidates of British nationality with degree or equivalent qualifications to enable them to obtain wider experience and additional training in industrial establishments at home or abroad.

Italian Industry in 1954

Progress Shown Although Somewhat Limited

From Our Own Correspondent

IN spite of certain difficulties, the Italian chemical industry made some progress in 1954, mainly due to the favourable influence exerted on this sector by other activities. For instance, the improvement in the textile field and particularly in artificial fibres and the wool industry, the satisfactory progress of iron and steel output, the development of the glass industry in relation to the increased housing activity, meant a larger demand for certain chemical products.

The satisfactory sales had important consequences in the national market for chemicals, which, after the stationary situation registered during the first part of the year, showed an upwards tendency—due also to the higher prices of some primary materials. The market was, however, steadily influenced by keen foreign competition, particularly from Western Germany.

The better disposition to buy shown by some important productive branches, large consumers of chemical products, was on the other hand accompanied by considerable improvements in the principal enterprises of the chemical sector: the rationalisation of plants and working cycles, careful training of personnel, the search for new sources of primary materials and energy, and improved commercial organisation in Italy and abroad.

Mineral Oil Cracking Plant

In the field of chemical utilisation of natural gas, new installations for the production of synthetic ammonia and derivatives of the acetic series began work in Porto Marghera. A well-equipped plant for the cracking of mineral oils, able to supply a series of olefines and primary materials for the preparation of plastics, solvents and other products, was started recently in Ferrara.

Among the new projects particular mention is deserved for the starting-up of a large plant for the production of sulphuric acid and phosphatic fertilisers in Porto Empedocle and the completion of two other plants for the production of sulphuric acid in Porto Marghera and Caravaggio.

The output of synthetic ammonia showed a considerable increase in comparison with 1953, owing to the increased production of fertilisers and to the larger demand for concentrated nitric acid. Sulphuric acid production rose similarly, due to development in the output of chemical fertilisers and artificial fibres.

Remarkable progress was also noted in the production of calcium carbide, primary material for the fabrication of calcium cyanamide; this increase annulled the negative effects due to the reduced request of carbide for the production of acetylene. Today acetylene is being produced from methane.

Caustic Soda & Chlorine

Small increases occurred in the production of sodium carbonate. An important development was registered in caustic soda and electrolytic chlorine, considerable quantities being required by the textile and paper industries. Moreover, electrolytic chlorine is finding interesting uses in the field of synthetic resins and organic derivatives.

A significant improvement was also noted in the output of sodium hypochlorite, owing to the larger demand on the part of blenders. The output of synthetic hydrochloric acid was considerably increased in comparison with the preceding year because of a greater demand by the metallurgical industry.

Greater increases were registered in acetic acid, acetic anhydride and acetate solvents; marked progress also occurred in the production of methyl alcohol because of the increasing consumption of formaldehyde, employed in the preparation of synthetic resins and synthetic textile fibres.

A 25 per cent increase took place in production of synthetic resins and plastics materials. Considerable improvements to be mentioned, above all, are in the production of polyvinyl chloride, polythene, polystyrene and polyvinyl acetate resins, together with a small increment in the output of phenolic resins. Continued in 1954 were the experiments directed to the preparation of polyester products; some increase was observed in the export of polyvinyl chloride products.

Forecasts for Italian consumption of phosphatic fertilisers in the 1953-54 campaign were greatly exceeded by the actual sales. An increase of consumption was also observed in nitrogenous fertilisers, but stocks increased.

Promising Industry

South Africa Looks to Germany

FOR technicians and 'know-how,' the Union of South Africa looks to the older countries 'such as Germany,' who have developed the chemical industry to what it is today, says Dr. Francois J. de Villiers, Industrial Adviser to the South African Department of Commerce and Industries, in the official *South Africa—United Kingdom & Commonwealth Survey* just published. Because the local market is still comparatively limited in many respects, Dr. de Villiers advises overseas industrialists to gain first-hand knowledge of the position before embarking on any manufacturing scheme.

Fourth in Importance

With an output of some £58,000,000 and 29,000 workers on the payroll, the chemical industry in South Africa today rates fourth in importance compared with other industrial groups. Gross output represents 8.4 per cent of the total output of all industries. Compared with similar figures for, say, 1930 when the percentage amounted to 7.6, it will be observed that the chemical industry has advanced in line with other industries over the last 20 years. However, the industry has notable achievements to its credit, such as two explosive plants which are the largest and second largest in the world; substantial production capacity in nitrogenous compounds and phosphatic fertilisers, and the heavy chemicals, and various insecticides. In addition the fermentation industry based on sugar cane molasses is responsible for the production of a wide range of alcohol solvents, while the steel industry disposes of a fairly wide range of coal-tar distillation by-products.

Coal in South Africa is cheaper than anywhere else in the world, so that either as a source of chemical raw material or energy it offers substantial advantage to the local processor. Despite this and other favourable factors, the development in the chemical industry has been in a comparatively narrow field. This is because of the relatively limited internal market for most chemicals and the comparatively high capital cost normally associated with chemical plants. However, comments Dr. de Villiers, past developments have shown that whenever internal demand justified the capital expenditure private enterprise was not slow in establishing plants. There have also been notable developments where local manufacture was initiated primarily for export, due to the very favourable conditions existing for such manufacture. Dr. de Villiers instances the manufacture of chrome chemicals, due to the abundance of cheap high-grade chrome ores; the extraction of fish oil and vitamin A concentrates, due to a plentiful supply of fish in coastal waters; and a project, in the course of erection, for the production of chemical pulp for export—at a later stage, part of the pulp will be converted to rayon.

World Steel Output Down

TOTAL world steel production declined during 1954 from 258,706,000 tons in the previous year to 245,190,000 tons. The fall was largely due to a decrease of 20.8 per cent in US output. Canadian production was also lower, by 24.1 per cent, but most other countries showed increases.

The most significant rise was in countries in the Soviet bloc. Combined production of the Soviet Union and her satellites was 62,825,000 tons, against 58,337,000 tons in 1953. Russian production alone provided 44,900,000 of the 1954 total, compared with 41,800,000 in the previous year.

This rise, with the decline in the free world, reduced the latter's advantage over the Soviet bloc from a four-to-one to a three-to-one ratio.

Glassware Order for UK

AN order from a German firm for large-scale evaporation equipment for the pharmaceutical industry has been placed with QVF Ltd., of Stone (Staffs).

Mr. Brian H. Turpin, the firm's managing director, describing the order as 'a feather in the cap of British industry,' said it had considerable prestige value. From 1900 to 1939, Germany had been pre-eminent in the laboratory and industrial glassware industry. To the best of his knowledge this would be the first British industrial glassware to go to Germany, but there was every prospect of the extension of British business within Germany.

Courtauld Atomic Models

Greater Accuracy, Greater Clarity, in New Designs

NEW space-filling atomic models incorporating elastically-distortable valency angles as well as free rotation about single bonds, and allowing the use of bonds of adjustable length, are now being marketed by Griffin & Tatlock. These models, on a scale of 0.8 in. to 1 Å, were originally developed in the Maidenhead laboratory of Courtaulds Ltd.

In the space-filling models originally described by Stuart (*Z. Physik. Chem. B*, 1934 **27**, 370), the opposing plane faces of bonded atoms in a molecule were in direct contact with one another, and therefore there was no possibility of allowing any distortion of either the valency angles or of the van der Waals radii. In the Courtauld models on the other hand a link of 0.4 in. (0.5 Å) is used for joining the atoms together, and the plane faces are cut back correspondingly to maintain the correct internuclear covalent distances.

The link consists of a brass pin shaped at each end to fit into press-stud sockets which are mounted in the plane faces of the models. The sockets are fitted with a spring made to withstand a tension of 5½ lb. in a direction normal to the face. The link may be inclined up to 15° from the normal, but the angle is usually limited to 6° by a metal-faced rubber collar. While allowing molecules to be built in which the valency angles are to some extent distorted, the collar supplies a restoring force; at the same time free rotation about single bonds is possible. Where, as in certain strained ring formations, the link must be distorted through an angle greater than 6°, sponge rubber spacing collars are used.

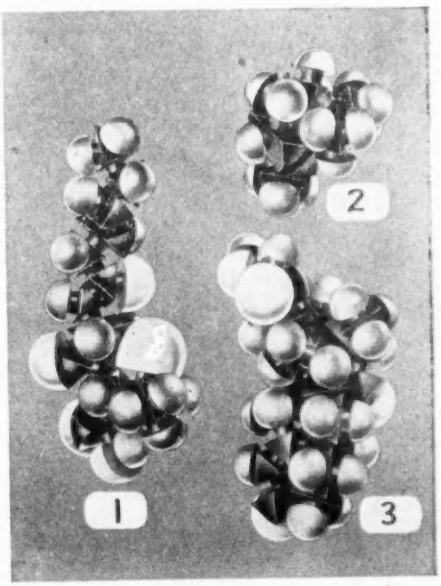
Adjustable Links

Where a sufficiently accurate value for a partial double-bond length is not given by combining two atomic models with the standard link, an adjustable link may be used. This is made of two threaded members, adjustable to the right length, which may be locked together permanently with a touch of solder, or temporarily with adhesive. They are used with sponge rubber collars.

The advantages of the link method of attachment are numerous. The length of link leaves the structure more open than in the case of the Stuart models, so that it is easier to observe and measure bond directions and follow the internal structure of large molecules. When chains are folded into complicated configurations, as in protein structures, manipulation is easier and the restoring force of the rubber collar ensures that the normal valency angle will be assumed if the structure does not involve strain.

The models are constructed so that the radii of their spherical surfaces correspond to the van der Waals radii obtained from crystallographic data, and where steric hindrance occurs, the distortion of the valency angle gives an indication of the degree of hindrance.

The models are made in mahogany, the tolerance allowed being ±0.015 in. The covalent radii chosen for the models are in general those given by Pauling, who showed that a value could be attributed to each ele-



Some examples of the Courtauld models : 1, penicillin F; 2, α-pinene; 3, cortisone

ment for its single, double or triple bond radius such that the sum of the appropriate values for any two bonded atoms equalled the length of the bond between them. Atoms to be joined by double bonds have two sockets ¼ in. apart; for triple bonds there are two sockets 1 in. apart, the different spacings making it impossible to join a double-bonded atom to a triple-bonded one.

A separate atom model is needed for each valency arrangement of the element. When the arrangement involves only σ bonds, the models are designed by cutting back spheres, of radii equal to the van der Waals radii, by an amount which leaves the distance from the atom centre to the middle of the link equal to the appropriate covalent radius. An exception is made with the halogens (other than fluorine) where the segment of the sphere is given a conical surface between the spherical and planar surfaces so as just to allow six halogens to be attached to a benzene ring. Some sacrifice of fidelity, however, results from the device, since the distortion of normal angles in *ortho* derivatives for instance is not shown.

For those bonds involving π electrons, the van der Waals radius will be longer in a direction normal to the bonds as a consequence of the π electron orbitals. This factor has been taken into account in the Courtauld models, the longer van der Waals radius of the carbon model being based on the 'height' of the benzene ring, 3.6 Å. The same value has been used for nitrogen atoms which will be bonded to carbon in resonating systems, since the π electron systems will tend to be in one plane.

Altogether 30 models are at present available: one bromine, eight carbon, one chlorine, one fluorine, two hydrogen, one iodine, seven nitrogen, three oxygen, two phosphorus, one silicon and three sulphur. A distinctive colour has been chosen for each element, the colours being so selected as to make the distinction between elements as easy as possible in monochrome photographs. Each atom species has been given a number which has been stamped on the model. Further models of other atom valency arrangements may be produced as experience and the demand for them suggest.

The use of atomic models is analogous to the use of a calculating machine. Provided that the models are made with sufficient accuracy, the results obtained will be as accurate as the data used in their design allow. Primarily designed for research laboratories, the models should also prove eminently suitable for educational purposes in both universities and schools.

Tariff Cuts 'Damaging'

FURTHER reductions of tariffs on chemicals would damage the American chemical industry and contribute little towards increasing foreign trade of other countries, Mr. Fred J. Emmerich, chairman of the board of the US Manufacturing Chemists' Association, said recently. He was expressing the association's belief that changes in tariff rates on chemical products, where necessary, should be made only on a product-by-product rather than any 'across-the-board' basis.

With every important industrial country in the world employing devices of one kind or another to protect its native industries, MCA believes it would be inadvisable for the United States to adopt tariff policies that would weaken a vital domestic industry or destroy incentive to build new plants. In addition, Mr. Emmerich pointed out, such action would 'discourage research and development work, result in a decay of techniques of production and dry up the reservoirs of scientific and managerial manpower necessary to maintain America's technological leadership.'

Exeter Symposium

A CHEMICAL Society symposium on 'Recent Work on Naturally Occurring Nitrogen Heterocyclic Compounds' is to be held at The University College of the South West of England, Exeter, from 13 to 15 July.

Papers will be read at four sessions, and the following are expected to take part: Professor A. Albert, Professor J. Baddiley and Dr. S. F. Mason (purines, pyrimidines and related compounds); Professor R. P. Linstead, Dr. A. Neuberger, Sir Alexander Todd and Dr. M. Whalley (macro-heterocyclic compounds); Professor R. D. Haworth, Dr. J. D. Loudon, Dr. H. T. Openshaw and Dr. T. S. Stevens (alkaloids).

Accommodation for those attending the symposium has been arranged in Halls of Residence at University College.

Tetracycline

Patent Awarded to Pfizer

ISSUE of a patent to Chas. Pfizer and Co. Inc. on tetracycline, the newest broad-spectrum antibiotic was announced recently in the *Gazette* of the US patent office. The patent includes 18 claims covering the manufacture, use and sale of tetracycline and its salts as well as processes for their manufacture, and antibiotic compositions containing these materials.

The decision marks the end of a series of interference proceedings which delayed the issue of the patent for an extended period of time.

Tetracycline, a discovery of Pfizer research, is an important new addition to the field of antibiotics in the fight against infectious disease. Marketed by Pfizer under the trade name of Tetracyn, it is finding increasing acceptance by the medical profession in the treatment of a wide variety of infections.

The award of the patent on tetracycline to Pfizer, in addition to being another milestone in the company's research progress in the field of antibiotics, settles a controversy which has extended through two successive interference proceedings in the US Patent Office. In February 1954 the Lederle Laboratories Division of American Cyanamid Company conceded priority to Pfizer in settlement of the first patent interference and received a licence under Pfizer's patent as part of the settlement agreement.

Subsequently a second interference involving Bristol Laboratories was declared, and was terminated in October 1954 by a decision of the US Patent Office.

The issue of the patent to Pfizer finally gives official recognition of Pfizer's discovery of tetracycline. Legal proceedings have now been instituted against Bristol Laboratories, E. R. Squibb and Sons Division of the Olin Mathieson Chemical Corporation and the Upjohn Company, for infringement of the patent, asking for treble damages and an injunction to prohibit unlicensed manufacture and distribution of the product.

Sulphur Deposits in India

Pyrites deposits with an average sulphur content of 43 per cent have been discovered in two areas of the Shababad district of Bihar, India. They occur at the base of the vertical scarps of the Upper Kaimur sandstones.

Synthetic Resin Adhesives

BRITISH Standards Institution has issued a revised edition of BS. 1203 'Synthetic resin adhesives for plywood (phenolic and aminoplastic)'. In the new edition three types of synthetic resin adhesive have been specified and their classification has been made on the basis of their durability under exposure to weather, upon which data have been obtained over a number of years for the phenolic and aminoplastic resins in current use. The results of these long term trials have been linked with the behaviour of standard test-pieces when immersed for prescribed periods in cold, hot or boiling water, or steam, and tests of this nature are the distinguishing requirements of the revised standard. Among the organisations represented on the committees responsible for drafting the revised standard are the Association of British Plywood Manufacturers, the British Plastics Federation, the DSIR Forest Products Research Laboratory, the Ministry of Supply, the Ministry of Works, the Timber Development Association and the Timber Trade Federation of the United Kingdom.

BS. 1204, originally published under the same cover as BS. 1203, is at present under revision and will be published separately. A reprint of BS. 1204:1945 is now available, price 3s. Copies of BS. 1203 can be obtained from the British Standards Institution, Sales Branch, 2 Park Street, London W.1, price 3s.

Wage Increases

IN a review of wages and prices during 1954, the *Ministry of Labour Gazette* says there was an increase in the average level of weekly rates of wages of about 4½ per cent, compared with about 3 per cent during the previous year and 6 per cent in 1952. Among the increases were those in the heavy chemicals industry early in the year. The minimum rates agreed by the Chemical and Allied Industries Joint Industrial Council were increased in January by 1½d. an hour for men and 1d. for women. In another section of the industry the basic time rates were advanced by 1¼d. an hour in March.

In December various classes of workpeople employed by constituent firms of I.C.I. (other than the metal group) were granted increases which amounted to 3d. an hour for craftsmen and 2½d. or 2¾d. an hour for other workers.

Instruments Exhibition

Largest of its Kind

THE third British Instrument Industries' Exhibition to be held at Earl's Court, London, from 28 June to 9 July, will be the largest of its kind. It will show the latest equipment of manufacturers of scientific and electrical instruments, industrial meters, automatic controls, scientific glassware, drawing office equipment, and of associated manufacturers.

Instrumentation and controls are important to every industry by providing means for research and for establishing and maintaining optimum working conditions, thereby securing increased and cheaper production and higher and more consistent quality with less wear and tear on plant. This exhibition offers the industrialist the opportunity to examine the latest methods and equipment which are now at his disposal. Experienced technicians will be available throughout the exhibition to demonstrate the many ways in which equipment can be used.

The organisers, F. W. Bridges & Sons Ltd., have made arrangements to cater for the needs of overseas visitors, and it is already apparent that large numbers will be attending.

The exhibition is sponsored and actively supported by the following associations: The British Electrical & Allied Manufacturers' Association, The British Industrial Measuring & Control Apparatus Manufacturers' Association, The British Lampblown Scientific Glassware Manufacturers' Association, The Drawing Office Material Manufacturers' & Dealers' Association, and The Scientific Instrument Manufacturers' Association of Great Britain.

Concurrently with this exhibition there is the 10th International Printing Machinery & Allied Trades' Exhibition at Olympia, and in view of the rapidly growing importance of instrumentation to the printing industry, visitors to this will have the advantage of studying both modern printing machinery and the appropriate field of instrumentation, including temperature control.

Indian Output Rises

INDUSTRIAL production in India during 1954 is estimated to have risen appreciably compared with the previous year. The rise in the chemicals sector is illustrated by the following figures, published in the January issue of *Indian Trade and Industry*:

Caustic soda, 30,193 tons in 1954 (1953, 22,909); bleaching powder, 2,948 (1,942); soap 84,000 82,000); glycerol, 2,598 (2,508); liquid chlorine, 9,607 (8,131); sulphuric acid, 146,000 (109,091); superphosphate, 104,400 (48,294); ammonium sulphate, 332,610 (319,616); copper phosphate 787 (518); sodium sulphate, 3,288 (2,702); dichromate, 3,126 (2,510); soda ash, 49,538 (56,870). Soda ash production fell because one of the plants was closed for five months for expansion and renovation.

Production of oxygen and acetylene increased considerably as a result of the existing unit increasing its capacity and two new units coming into use. There was a slight decline in output of power alcohol because some distilleries closed through lack of molasses; production of rectified and denatured spirit went up slightly. There were considerably more liver extracts in the form of injections, but fewer orals.

Cyclethrin

A NEW insecticide for controlling house flies and other insects has been announced by Carbide & Carbon Chemicals Company, a Division of Union Carbide & Carbon Corporation, New York. It has been given the name 'Cyclethrin' and is chemically related to allethrin. The complex cyclethrin molecule was first synthesised in Carbide's research and development laboratories at South Charleston, West Virginia, and was evaluated against insect pests by the Biological Research Fellowship at Boyce Thompson Institute for Plant Research.

Cyclethrin is synergised by readily available synergists to a far greater extent than is allethrin. Therefore it can be used to advantage in oil space sprays and in low-pressure aerosols for use against house flies, gnats, and mosquitoes. Cyclethrin is more effective when used in dairy and livestock sprays. Field tests have shown that treadle spray concentrates containing cyclethrin afford dairy and beef animals excellent protection from horse flies. In addition, sulphoxide and piperonyl butoxide synergises cyclethrin better than allethrin for knockdown of german roaches.

Cyclethrin has the same low order of toxicity to warm-blooded animals as allethrin or pyrethrins. It is available in limited quantities for test purposes.

UK Sulphuric Acid Returns

Production & Consumption in 1954

PRODUCTION of sulphuric acid and oleum (chamber, tower and contact) totalled 2,042,492 tons of 100 per cent H_2SO_4 in the United Kingdom during 1954. Production in 1953 was 1,875,177 tons, but the summary of monthly returns issued by the National Sulphuric Acid Association Ltd. this year excludes all Government plants, so that figures in the accompanying tables are not strictly comparable to previous ones.

Consumption increased to 2,047,748 tons, compared with 1,901,826 tons in 1953. Stocks at the end of the year were 71,701 tons, against 63,138 tons at the end of 1953.

RAW MATERIALS
(*Tons*)

Data referring only to Acid Makers' Returns	Pyrites	Spent Oxide	Sulphur and H_2S	Zinc Concentrates	Anhydrite
Stock 1 Jan. 1954	145,513	177,827	41,541	66,980	790
Receipts	511,808	302,986	267,846	188,669	176,342
Adjustments	+1,608	+7,235	+32	−1,984	—
Use	494,224	286,807	258,421	197,963	176,742
Despatches*	8,939	59,288	4,977	89	—
Stock 31 Dec. 1954	155,766	141,953	46,021	55,613	390

* Including uses for purposes other than sulphuric acid manufacture.

CONSUMPTION OF SULPHURIC ACID AND OLEUM
UNITED KINGDOM, 1954

Trade Uses	Tons 100% H_2SO_4
Accumulators	9,270
Agricultural purposes	8,219
Bichromate and chromic acid	14,564*
Bromine	21,850
Clays (Fuller's Earth, etc.)	10,469
Copper pickling	2,697
Dealers	14,241
Drugs and fine chemicals	23,960
Dyestuffs and intermediates	83,759
Explosives	32,066
Export	3,392
Glue, gelatine and size	527
Hydrochloric acid	60,308
Hydrofluoric acid	11,996
Iron pickling (incl. tin plate)	108,467
Leather	4,775
Lithopone	15,604
Metal extraction	4,322
Oil refining and petroleum products	54,763
Oils (vegetable)	11,728
Paper, etc.	7,314
Phosphates (industrial)	1,116
Plastics, not otherwise classified	28,816
Rayon and transparent paper	248,161
Sewage	11,144
Soap, glycerine and detergents	47,752
Sugar refining	596
Sulphate of ammonia	290,338
Sulphates of copper, nickel, etc.	23,098
Sulphate of magnesium	4,922
Superphosphates	457,073
Tar and benzole	23,054*
Textile uses	20,552
Titanium dioxide	211,303
Unclassified	175,532
Total	2,047,748

* There have been adjustments in the allocations to these two items. The present figures are not strictly comparable with those in previous years.

SULPHURIC ACID AND OLEUM
(*Tons of* 100% H_2SO_4)

Data referring only to Acid Makers' Returns	Chamber and Tower only	Contact only	Chamber Tower and Contact
Stock 1 Jan. 1954	30,176	28,672	58,848
Production	634,363	1,408,129	2,042,492
Receipts	91,977	124,528	216,505
Oleum Feed	—	5,808	5,808
Adjustments	−1,759	+1,037	−722
Use	364,228	573,721	937,949
Despatches	360,877	952,404	1,313,281
Stock 31 Dec. 1954	29,652	42,049	71,701
Total capacity represented	790,370	1,572,470	2,362,840
Percentage production	80.3%	89.5%	86.4%

End of Midlands Society

THE Midlands Society for Analytical Chemistry recently agreed by a large majority at a special general meeting to disband itself and form the nucleus of a new Midlands Section of the Society for Analytical Chemistry. This decision was approved by the Council of the Society for Analytical Chemistry.

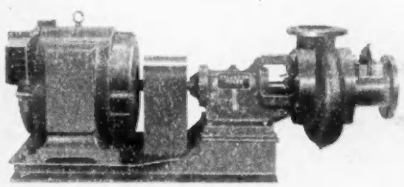
The inaugural meeting is to be held at 7.15 p.m. on Tuesday, 22 February, at the Mason Theatre, The University, Edmund Street. After the business session Dr. D. W. Kent-Jones, president of the society, will give an address on 'Developments in the Society for Analytical Chemistry.'

Pump with a Difference

Swiss Invention Produced in UK

MANUFACTURED under licence in this country by Cellulose Development Corporation Ltd., of Hatch End, Middlesex, the Celdecor Egger patent centrifugal pump is a departure from orthodox design and, it is claimed, is superior where aeration or the nature of the material makes the usual type of pump unsuitable.

Its features are that it pumps evenly although air, gas or foam may be present, it will not air-lock and is self-regulating and self-priming, it deals easily with high consistencies and is specially suitable for viscous liquids, it is, for all practical purposes, unchokeable, and it is at least as efficient on clear water as conventional pumps.



The Celdecor Egger centrifugal pump

A Swiss invention, the pump has a patent impeller. Because of the shape of the blades and the divergence of the passages in this, the speed of the liquid relative to the impeller is considerably lower and also more uniform than in the conventional type of pump. The cross-sectional area of the outlets from the impeller may be as much as ten times that of the inlets, according to requirements. As a result there is a marked reduction in the friction between the liquid and the impeller surfaces and also in the internal friction in the liquid.

Owing to the shape and small number of the blades, the fluid, to attain the same speed, travels three times the distance it does in a similar conventional type of pump. This results in a lower acceleration of the liquid in attaining kinetic energy and a lower deceleration during the conversion of the kinetic energy into pressure energy.

The shape of the blades also means that the liquid lags slightly behind them during rotation. This lag creates a decrease in pressure behind the blades which greatly increases the suction lift of the pump.

If the liquid being pumped contains gas, this collects continuously in this zone of low pressure, thus avoiding gaseous pockets forming inside the liquid. The gas collected is free to leave the impeller at the periphery where it mixes uniformly with the liquid.

Plastics Industry's Output Up

THE British plastics industry had a record production and export year in 1954, it is announced by the British Plastics Federation. Output was more than 200,000 tons for the first time, about 25 per cent more than in 1953. While most branches of the industry showed improvement, the advance was most marked in production of the thermoplastics materials—PVC, polythene and polystyrene.

Various expansion plans now under way will mean higher capacity still in 1955, and the biennial British Plastics Exhibition in London this year from 1 to 11 June, it is expected, will give another fillip to the export trade.

Exports in 1954 of plastics materials alone amounted to 70,000 tons, valued at more than £20,000,000, a rise of nearly £3,500,000 on the value for 1953, the previous highest figure. The tonnage is more than three times that for 1947 (21,000 tons) and more than 15 times that for 1938 (4,300 tons).

Australia, with an increase of more than £1,000,000 to over £4,500,000, remained the best market in 1954. Exports to India, New Zealand, South Africa, Holland, Denmark and Sweden, all showing substantial rises, were valued at between £1,200,000 and £1,400,000 each.

The exported materials consist of moulding powders, resins, sheet, rod, tube, film and foil, but do not include manufactured articles and parts, large numbers of which are used in finished products such as radio sets, motor-cars and domestic ware.

Grant for Research

The American Cyanamid Company has made a grant to Cambridge University of £1,050 in support of research in organic chemistry and biochemistry in the University Chemical Laboratory under the direction of Professor Sir Alexander Todd.

Trade Commissioners' Visit

THREE Commonwealth Trade Commissioners—of Australia, New Zealand and Malaya—visited the Packaging Exhibition at Olympia in January to see Hickson's Timber Impregnation Co. (GB) Ltd. Their visit coincided with the news that the managing director of the company, Mr. F. N. Riding, had left for a world business tour.

Mr. J. N. Davies, Trade Commissioner for Malaya, said his country welcomed the entry of the timber impregnation industry into the Malayan timber trade. 'The timber industry is one of the most valuable in the Malayan economy' said Mr. Davies, 'and new interest in the trade which will increase its potential is gladly welcomed by the Malayan Government.'

New Zealand has 28 vacuum-pressure impregnation plants operated by Hickson's Timber Impregnation Co. (NZ) Ltd. Mr. G. B. Patterson, Senior Government Trade Commissioner for Australia, said reaforestation schemes in the last two or three decades had given Australia millions of acres of new timber land. With Australia's growing industrial economy there was an increasing demand for the industrial use of vacuum-pressurised timber.

After completing his tour of south-east Asia and Australasia Mr. Riding will go on to America, where he is to attend the annual convention of the American Wood Preservers' Association, held in St. Louis. He is due to return to this country at the end of April.

On the stand of Hickson's Timber Impregnation Co. (GB) Ltd. at the Packaging Exhibition. Left to right: Mr. J. N. Davies (Trade Commissioner for Malaya), Mr. C. J. Ady (London director of Hickson's) Mr. A. K. Watson (New Zealand Trade Commissioner), Mr. J. H. Stubbs (Hickson's export department, Malayan division), Mr. J. F. Moss (Hickson's export manager) and Mr. G. B. Patterson (Senior Trade Commissioner for Australia)

Canada's Output Went Up

CANADIAN manufacturers produced $796,562,234 worth of chemicals and allied products in 1952, an increase of more than 2 per cent over the 1951 output value of $776,489,391, according to the Bureau of Statistics review. The 14 industries in the group had 1,075 plants in 1952 and employed 47,694.

Gross production value increased in 1952 over 1951 in all but five of the industries: fertilisers to $78,743,491 from $74,488,720; paints and varnishes to $107,406,164 from $104,839,285; soaps, washing compounds and cleaning preparations to $84,461,282 from $73,718,714; toilet preparations to $27,059,783 from $22,535,080; inks to $10,923,553 from $10,582,762; polishes and dressing to $15,966,171 from $13,244,675; compressed gases to $16,201,464 from $15,378,363; coal tar distillation to $12,634,276 from $12,077,290; and miscellaneous chemical products to $143,546,514 from $131,543,294.

Output value decreased in the acids, alkalis and salts industry to $114,187,526 from $117,822,758; the medicinal and pharmaceutical industry to $88,022,387 from $89,248,867; the primary plastics industry to $34,638,754 from $39,370,423; the vegetable oils industry to $51,931,990 from $60,202,123; and adhesives industry to $10,838,879 from $11,437,037.

Canadian Plastics

Progress Slowed by Tariffs

V. G. BARTRAM, president of Canadian Resins & Chemicals Ltd., stated in a new year's review that Canada's plastics industry has experienced another year of steady growth in 1954. However, there has been no improvement in the export situation. Markets formerly enjoyed abroad have all but disappeared, since most countries to which Canadian plastics were at one time exported are now producing their own. In addition, in the export field Canada is hampered by the strong Canadian dollar.

Situation Unbalanced

Also responsible for restricting the country's plastics industry to the domestic market is the unbalanced tariff situation existing between Canada and other countries—and even the domestic market Canada cannot claim for herself. Because of the proximity of the USA, the disparity in tariffs between the two countries is the most apparent and the one that most seriously affects the plastics industry. Whereas a high tariff wall prevents Canadian manufacturers from even considering the possibility of looking to the USA for additional markets, the tariff on plastic goods coming into the country is not sufficient to protect these same manufacturers from having to meet competition from imports on the home market.

Polyethylene has attracted widespread attention in Canada ever since the first Canadian plant to produce polyethylene resins came on stream early in 1954. This readily available supply has stimulated manufacture of countless new end products for both consumer market and for industry. The future looks promising also for vinyls. They are continuing to show greater growth in flooring and coated fabrics and high hopes are held for them in the form of dispersion resins for foamed products.

Another indication of progress is that adequate production facilities for all types of phenolic synthetic resin end products are now available in Canada. The basic raw materials for them, phenol and formaldehyde, are also commercially available for the first time. This should result in increased activity and growth in this particular part of the industry.

Lecture Crowded Out

FULL HOUSE notices were needed when Professor G. Schwarzenbach, of Zurich University, lectured to the Society for Analytical Chemistry on 2 February. The lecture theatre of the Royal Institution was completely filled by 579 members and visitors, and over 30 people had to be turned away.

Professor Schwarzenbach spoke on 'The Complexones and their Analytical Applications.' It can be deduced theoretically, he said, that certain aminopolycarboxylic acids with nitrogen in the branching positions of the molecule and —COOH as terminal groups should have extraordinary properties as complexing agents. Indeed such substances are able to form chelates with almost any metal cation, even with lithium and sodium. Ethylenediaminetetra-acetic acid (EDTA) has the best possible structure, its anion being sexadentate and the chelate rings formed with the metal being 5-membered. The formation of complexes with EDTA can be used as a basis for titration procedures. The corresponding titration curves (pM = —log [metal-ion concentration] against the volume of complexing agent added) can be calculated theoretically.

It can also be shown that there will be a sharp jump of pM at the end-point corresponding to the jump of pH during the titration of hydrogen ion by alkali. This jump can be made visible with a suitable metal indicator. The complexones can also be used to buffer metal ions and as masking agents during gravimetric analysis. New separation procedures are made possible, not only through differences in the stabilities of the various metal complexes, but also through differences in the rates of their formation and dissociation.

Draft Amendments

THE Indian Standards Institution has issued draft amendments to IS:251-1950 Indian Standard Specification for Soda Ash, Technical (Tentative) and IS:252-1950 Indian Standard Specification for Caustic Soda, Technical (Tentative).

When the standards were issued they were kept tentative in the hope that manufacturers would be able to overcome their difficulties in raising the quality of their products. Comments on the draft amendments will be entertained up to 15 March.

CHEMICAL ENGINEERING PROCESSES & EQUIPMENT. General editor, E. Molloy; advisory editor, E. Carr. George Newnes Ltd., London. 1955. Pp. viii + 236. 21s.

This book contains a compilation of articles by different authors dealing with a wide range of processes and equipment used in chemical engineering practice. It makes no attempt to deal with the theoretical principles underlying these but provides a considerable amount of useful practical information and includes numerous diagrams and plates illustrating different types of equipment, together with operating data. The various sections deal with crushing rolls, ball and pebble mills, industrial mixing plant, mixing, emulsification, vibro-agitation, heavy media separation processes, tabling, gyratory sieving and straining, magnetic separation, flotation, elutriation, filtration, porous stainless steel filters, evaporating plant and techniques, crystallisation, industrial distillation plant, heat exchangers, drying equipment, dust collectors and electrical precipitators.

There is a lack of uniformity in these sections in that some of them include references to standard works on chemical engineering and to the literature while others do not, and are somewhat reminiscent of plant manufacturers' catalogues. The book will prove useful to those employed in the chemical and allied industries who seek information about the various types of equipment available, and to the student will serve as a useful companion to his text-books dealing with the principles of chemical engineering. —R.I.

50 JAHRE ARZNEIMITTELFORSCHUNG. By C. L. Lautenschläger. Georg Thieme Verlag, Stuttgart. 1954. Pp. viii + 486. DM.36.

This book is a comprehensive review of progress during the last 50 years in the development of both chemo- and pharmacotherapeutical medicaments. Perhaps it suffers a little from the weakness common to reviews of trying to cover too much in too few pages. The condensed style approaches that of, say, the *Annual Reports on the Progress of Chemistry* except that there are fewer chemical formulae and equations. There is a noticeable lack of illustrations, tables and diagrams. Although due weight is given to the contributions of chemists the work as a whole tends to be rather more biochemical, probably quite justifiably. Occasional chemical syntheses are given such as those of salvarsan, corpus luteum hormone and the ring systems of aneurin. The technical methods of obtaining ascorbic acid and penicillin are described.

The field is divided into three parts. The first one, dealing with prophylaxis and the chemotherapy of infectious diseases includes such items as disinfectants, detergents, antigens, vaccines, antimalarials, sulphonamides, antibiotics and many more. Although the emphasis is always on the last 50 years the development of those items which possess a longer history is traced further back. A most adequate theoretical and physiological background in connection with each topic is provided. It is surprising to find that under prophylactic measures ethylene glycol is recommended as non-toxic and suitable for use in disinfecting sprays and aerosols. It should not be overlooked that some immediate derivatives of ethylene glycol, such as dioxan, are known to be extremely poisonous and have caused fatalities. It is claimed at another point that quinine was synthesised by Rabe in 1929. Surely this refers to dihydroquinine. It was not until 1944 that a complete synthesis of quinine was achieved as a result of the work of Woodward and Doering.

In the second part, entitled 'Biocatalysts,' progress in the fields of enzymes, natural and synthetic hormones and vitamins is described. One attractive feature of this part is the frequent interpolation of chronological lists of outstanding achievements in the fields concerned. The third part 'Pharmacotherapeutic Preparations' covers such diverse

materials as anaesthetics, narcotics, analgesics, antipyretics, diuretics, antihistamines, laxatives, alkaloids and X-ray contrast media.

Readers in this country are bound to take some exception to the marked tendency to extol the contributions of German workers. The early pioneers referred to in the introduction include Liebig, Wöhler, Hofmann, Bunsen, Röntgen, Koch and Ehrlich, the only non-Germans being Pasteur and Takamine. There is no mention there of Davy, Lister, Frankland, Williamson, Perkin or Gowland-Hopkins; admittedly some of these are referred to at appropriate places in the text albeit grudgingly. In addition to the case of quinine synthesis already cited, this attitude is exemplified by statements such as that 'many antimalarial preparations approach the efficacy of plasmoquin and atebrin (mepacrine)' which are German discoveries, 'but none exceed these to any marked extent.' The formula for paludrine (proguanil) is indeed given but Curd's name and his other successes, such as Antrycide, are not.

These criticisms apart the book is an excellent survey of the whole chemotherapeutic field. It is a mine of information in concise but very readable form. Teachers, students and all those interested in biochemistry and the chemistry of physiologically active substances will find it of great value. As a reference work, too, it is to be highly recommended but suffers in this respect from the lack of an index. A number of misprints were noted.—M.C.

CHEMIE UND TECHNIK DER VITAMINE. By Hans Vogel, revised by Heinrich Knobloch. 3rd Edition, Volume II. Ferdinand Enke Verlag, Stuttgart. 1955. Pp. 176. DM.30.00.

The third instalment of Volume II (for previous reviews see THE CHEMICAL AGE, 1951, **64**, 360; 1953, **68**, 639; 1954, **70**, 737) has now appeared. It continues the description of the water-soluble vitamins by covering *p*-aminobenzoic acid and the folic acid group.

The same arrangement as previously has been adopted. The first 20 pages deal with the history, properties, preparation, occurrence, detection, estimation, biological importance, biosynthesis, pharmacology and technology of *p*-aminobenzoic acid. Over 200 literature references are given. The remainder is devoted to pteroylglutamic acid (PGA) and closely related compounds of the folic acid group. The history, constitution, synthesis, properties, detection, deficiency effects and pharmacology of PGA are described, together with its derivatives and conjugates. The enzymatic breakdown and biological role of PGA and its derivatives are discussed. Analogues of PGA are described, and a lengthy section is devoted to PGA antagonists, including their toxicity, mode of action, estimation, etc. Leucovorin (5-formyl-5:6:7:8-tetrahydro-PGA) is discussed in detail. A section on the technology of the group completes the account. A complete patent register is provided and over 600 references cover the literature up to 1954. A subject index covers the whole of Volume II which has so far appeared.

Little can be added to the previous reviews. The same high standard of style and presentation has been maintained, and there can be no doubt that this work, when complete, will be an invaluable aid to all interested in the many aspects of the vitamins. —A. R. PINDER.

Columbia Southern Plans

COLUMBIA Southern Chemical Corporation, Pittsburgh, Pa, which recently purchased controlling interest in a newly-formed Canadian chemical company, Standard Chemicals Ltd. (THE CHEMICAL AGE, 1955, **72**, 242), has extensive long-term plans to expand chemical manufacturing operations in Canada, according to our Montreal correspondent.

First step in this programme will be expansion and modernisation of the Beauharnois, Quebec, chlorine and caustic soda plant formerly owned by Dominion Tar & Chemical Co. Later steps will reflect results of an extensive Canadian marketing programme now under way.

Chief assets in the newly organised Standard Chemical Ltd. are the plant at Beauharnois and the resale chemical business of Standard Chemical Co. (operating as a division of Dominion Tar & Chemical). Dominion Tar also has a substantial minority interest in the new company, but the new setup further reflects a recent trend in Dominion Tar & Chemical policy to reduce its chemical operations. Some three months ago the Montreal East petrochemical plant was sold to Union Carbide Canada Ltd.

• HOME •

Sulphuric Acid Output

Sulphuric acid output during October amounted to 169,400 tons, compared with 165,500 tons in September; 175,000 tons were used, against 179,000 tons.

Unemployment in December

There were 4,096 people unemployed in the chemicals and allied trades in the United Kingdom on 6 December, according to figures published in the *Ministry of Labour Gazette*. Of this total, 2,343 were men and 1,753 women.

Record Rayon Output

British rayon output in 1954 reached the record level of 447,700,000 lb., 6 per cent more than the 1953 figure and 58 per cent higher than in 1952, when there was a textile recession. The increase was mainly accounted for by greater production of rayon staple.

New Prices for Shell Acetone

New prices for acetone which came into effect on 31 January have been announced by Shell Chemicals. Spot prices for delivery in Great Britain are now, per ton, in 40/45 gal. drums, in one delivery, 1 ton to 5 tons, £87; 5 tons to 10 tons, £86; 10 tons and over, £85.

Steel Price Increases

Increases in the maximum prices of alloy steels containing nickel, molybdenum or tungsten came into force on 7 February because of the higher cost of these materials. The increases vary according to the alloy content. The prices of some stainless steels and some of the alloy qualities of shell steel and forging ingots have been increased for the same reason. Maximum prices of cold rolled steel, 6 in. wide and narrower, have been increased by £1 a ton. There have been reductions in the maximum prices of free cutting quality and acid quality bright steel bars by amounts ranging from 6s. 6d. to 26s. a ton.

Nickel Shortage

Mr. Peter Thorneycroft, President of the Board of Trade, said in the House of Commons on 3 February that action was being taken to reduce the expected shortage of nickel during the coming year. Supplies, however, were still unlikely to be enough to meet the demand.

Fertiliser Output

Production of phosphatic fertilisers during September was 26,700 tons, against 21,500 tons in August. Consumption was 24,300 tons; 24,550 tons of nitrogenous fertilisers were produced for agricultural use in the same month and 25,870 tons in October.

Change of Name

Owing to the increasing demand for Twiflex couplings and to emphasise the company's future policy of providing a comprehensive power transmission service, it has been decided to change the name of Compression Ltd., a subsidiary of Sheepbridge Engineering Ltd., to Twiflex Couplings Ltd.

Production Index Up

The index of industrial production in the chemicals and allied trades had reached 169 (1948 average = 100) by September 1954, according to figures published by the Central Statistical Office. This compares with the total of 137 for manufacturing industries as a whole. For the third quarter of the year the index in the chemicals and allied trades was 160.

Commercial Supplies of Pure Metals

Mr. Bevins, Parliamentary Secretary to the Ministry of Works, said in the House of Commons on 1 February that iron, gallium and germanium had been prepared on a small scale in a high state of purity in the laboratories of the Department of Scientific and Industrial Research. Research was in progress, he said, on the preparation of pure chromium, indium, antimony and the rare earth metals and the further purification of iron and gallium. The results were available to industry.

Refinery Rebuilt

A reconstruction and modernisation programme undertaken at the oil refinery of J. O. Buchanan & Co. Ltd., Renfrew, after a fire which seriously damaged the plant and premises two years ago, has now been completed. The damage amounted to many thousands of pounds. The main building of the refinery, which was gutted, has been rebuilt along with other damaged premises, and refining plant of enlarged capacity and modern design installed. Plant is now being installed to manufacture copper naphthenate.

· OVERSEAS ·

Epikote Resins in Holland

The Royal Dutch Petroleum Company has started the manufacture of Epikote resins at its factory near Rotterdam.

More Cement in Israel

The production of cement by the Nesher plant at Haifa in 1954 totalled 563,099 tons, as against 464,755 tons in 1953, it was recently reported. Exports increased by 83.3 per cent, from 73,284 tons in 1953, to 134,364 tons in 1954.

Italian Oil Strike

On present tests about 100,000 tons a year, more than the whole of Italy's current production, will be yielded from an oil well discovered at Abruzzi. The discovery was made by the American Gulf Oil Company, working in conjunction with the Italian concern, Montecatini.

End of Transport Tax Urged

Mr. Donald G. Ward, director of transportation of the Olin Mathieson Chemical Corporation, presided at a recent meeting of the American National Conference for Repeal of Taxes on Transportation which called on Congress to repeal the wartime Federal taxes on transport of persons and property which, it is claimed, 'create a great injustice to the travelling and shipping public.'

Canadian Nickel for USA

The International Nickel Company of Canada has made the first delivery of approximately 450,000 lb. of refined nickel to the General Services Administration under the contract signed with the US Government agency last autumn providing for refining of certain nickel concentrates produced by Sherritt Gordon Mines.

Shemen Output Will Go Up

The output of the Israeli Shemen enterprise is due to increase threefold and will amount to 225 tons of oils and fats per day when the equipment recently ordered from Germany within the framework of reparations payments arrives, it is reported. Shemen recently began producing detergents and synthetic products for use in the paints industry.

Record Output of Paper & Pulp

Norwegian production of paper and pulp in 1954 reached record figures. Paper with subsidiary items amounted to about 570,000 tons, 11.5 per cent more than in the previous best year, 1951. Mechanical pulp output was 643,000 tons and chemical pulp output 590,000 tons. Both were the highest figures recorded in Norway.

Oil Refinery Starts in India

India's largest oil refinery, on Trombay Island, Bombay, has just come into operation, with the start of the distillation units. The catalytic cracking plant and bitumen plant will come on stream in the next few months. The refinery has a capacity of 2,000,000 tons a year.

Israel's Sewage for Agriculture

The anticipated use of sewage for agricultural purposes will make it possible for Israel to develop large areas of land not hitherto developed. It is estimated that the sewage in Israel amounts to 100,000,000 cubic metres per year. This sewage contains approximately 4,000 tons of nitrogen, 1,500 tons of phosphorus, and 2,000 tons of potash.

Polish Chemical Exports Rising

Poland is exporting chemical articles in an increasing range to 42 countries of Europe, Asia, Africa and America. Their value this year will increase by some 9 per cent as compared with 1954. Among the most important chemical articles exported by Poland are various products of the coal distillation industry. The structure of the Polish chemical exports was considerably changed last year. Instead of selling basic chemical raw materials abroad, there is now a shifting over to the export of articles obtained by processing these raw materials.

Greek Oil Refinery

The contract for the construction of an oil refinery in Greece has been awarded to the German firm Hydrocarbon Mineraloel GmbH of Düsseldorf. The refinery will have a capacity of over 1,300,000 tons annually, and is expected to be functioning in two years' time.

· PERSONAL ·

Howards of Ilford Ltd. announce that MR. BERNARD THISTLETHWAITE, O.B.E., F.C.A., and MR. JOHN L. ALLISON, secretary and export manager respectively, have been appointed directors.

DR. H. M. STANLEY, M.Sc., Ph.D., has been appointed controller of research and development of the Distillers Company Limited in succession to DR. F. ROFFEY, Ph.D., F.R.I.C., who remains technical director of the company and has taken on the additional duties of personnel director of the company's industrial group. Dr. Stanley, who became deputy controller of research and development in 1945, will soon have completed 25 years' service with the company. He is a graduate of Birmingham University, where he worked with the late Professor G. T. Morgan. He is known particularly for his investigations into the production of petroleum derivatives and the economics of their application in the chemical and plastics fields.

DR. ROBERT H. BOGUE, organiser of the research programme of the US National Bureau of Standards' Portland Cement Association Fellowship, has retired after 30 years' service. Dr. Bogue, recognised as an international authority on Portland cement, is the author of numerous papers and several books on the subject. He is a member of the Portland Cement Association, the American Chemical Society, the American Concrete Institute and the International Symposia on the Chemistry of Cement.

The title of University Research Fellow in the University of Birmingham has been conferred upon DR. C. A. DIAZ FLORIS during the tenure of his present post in the Department of Chemical Engineering. Dr. Diaz Floris took his Master's degree in chemistry at La Laguna University, and his Doctorates of industrial chemistry and pure science at Madrid, where he was assistant professor. He came to Birmingham as Ramsay Fellow.

Birmingham University have announced the names of six people who are to receive honorary degrees on 2 July. Among them is PROFESSOR SIR ERIC K. RIDEAL, Kt., M.B.E., M.A., Ph.D., D.Sc., F.R.S., who is to be awarded an honorary D.Sc. Sir Eric is Professor of Physical Chemistry at King's College, London. A director of Monsanto Chemicals Ltd., he is a past president of the Faraday Society, the Society of Chemical Industry and the Chemical Society and past chairman of the Chemical Council. For the past two years he has been chairman of the Advisory Council on Scientific Research and Technical Development to the Ministry of Supply.

British Filters Limited announce the appointment of MR. F. D. MURRAY to the newly created post of general sales manager. Mr. Murray has had a wide experience in the adaptation of technical facilities to the requirements of the ultimate user of equipment, and in sales administration. He has held a number of senior positions, including that of sales manager of Air Industrial Development Limited, and was recently general manager of two of the Lewis Berger group of selling companies. He is an ex-county golf player. Mr. Murray's new duties will include the reorganisation and direction of the sales activities of the company.

The Export Credits Guarantee Department, the Government department providing insurance against the major risks of export trading, announces that the President of the Board of Trade has appointed MR. R. W. BURKITT to the newly-created post of deputy comptroller general of the department. Mr. Burkitt has been an assistant secretary in the Board of Trade.

ARTHUR A. ALLAN, JR., has been appointed sales manager of Bakelite Company, Division of Union Carbide Canada Limited. He joined the Bakelite Company in September 1945, as a member of the manufacturing staff, and for three years prior to entering the sales division was in charge of the phenolic moulding material department.

MR. H. H. SMITH, assistant manager of the special vessels department of Babcock & Wilcox Limited, has been appointed sales manager of Edwin Danks & Co. (Oldbury) Ltd. A native of Yorkshire, Mr. Smith was educated at Brighouse and at Halifax Technical College. Following ten years' experience in boiler manufacture with a Yorkshire firm, he joined the estimating department of Edwin Danks & Co. Ltd. After further experience in various capacities he was transferred in 1938 to the comparatively newly-formed special vessels department of Babcock & Wilcox Limited, being appointed assistant manager of the department in 1950.

The United Kingdom Atomic Energy Authority have appointed COL. G. W. RABY, C.B.E., M.I.Mech.E., as Deputy Director (Engineering) to the Research Group of the Authority at Harwell. He will take up his appointment in April. Col. Raby, who is 54, has had a distinguished career as an engineer in private industry and government service. Since 1951 he has been chairman and managing director of the Sudan Gezira Board and before that was with the Overseas Food Corporation. For 12 to 18 months after he takes up his new post, Col. Raby's services will be available to the Sudan Government for short periods.

MR. D. E. H. PEIRSON has been appointed secretary to the Authority. A Master of Laws at London University, Mr. Peirson has been an administrative civil servant since 1939.

MR. JOHN RYAN, vice-chairman of the Metal Box Company Ltd., has become chairman of the Treasury O. and M. (Organisation and Method) Advisory Panel, following the retirement of Sir James Reid Young, who had been chairman since the panel was formed in 1941.

PROFESSOR E. D. ADRIAN, O.M., M.D., M.A., Hon. D.Sc., Hon. LL.D., F.R.S., F.R.C.P, who was created a baron in the New Year Honours List, has chosen the title of Baron Adrian of Cambridge in the County of Cambridge.

DR. DOUGLAS S. CALDER has been appointed vice-president and general manager of Mallinckrodt Chemical Works Ltd., Montreal. He has also been elected to the board of directors. Dr. Calder was previously with Dominion Tar & Chemical Co. Ltd., as assistant to the vice-president responsible for special assignments and investigations into operations at large. Before this he was vice-president in charge of operations with Standard Chemical Co. Ltd. During the past several years Dr. Calder has directed his attention in the Canadian chemical industry to administrative duties and research and development.

A Derby-born man, 42-year-old MR. W. H. HOOPER, is the new general works' manager recently appointed by the Sunderland glassware manufacturing company of James A. Jobling & Co. Ltd., makers of 'Pyrex' brand glassware. Mr. Hooper studied at Derby School, Emmanuel College, Cambridge, and London University, and has since gained extensive management experience, holding extensive positions with a number of companies.

Obituary

For the past 25 years chairman of Sheppy Glue & Chemical Works Ltd., of Horley, Surrey, MR. FRANCIS HUGH STEVENS has died in his 85th year. Mr. Stevens was the grandson of the founder of the business and served the company for nearly 70 years.

Aluminium Exhibition

THE aluminium industry is to present a progress exhibition from 1 to 11 June at the Royal Festival Hall, London, to mark the centenary of aluminium as a commercial metal and show how it is being applied to industry. The exhibition will be divided into five sections: historical, research, production, present day use and the future.

It was at the Paris Exposition of 1855 that the French scientist, Professor St. Claire Deville, who had succeeded in extracting aluminium from clay by a chemical process, exhibited samples of the metal. Aluminium was rated a precious metal, since it cost £60 per lb. to produce.

The ten years since the last war have seen remarkable progress in which research results have been applied to problems in every industry.

New British Standards

The British Standards Institution has just issued two British Standards in its series for solvents and allied products. These are BS. 2534:1955 (Cyclohexylamine) and BS.2537: 1955 (Ethanediol [Ethylene Glycol]).

Publications & Announcements

CRANE Packing Ltd. of Slough, a member of the Tube Investment Group of Companies, have just completed the design and construction of special plant and equipment for the extrusion of PTFE in substantial quantities, to exact and uniform standards of quality. This plant, which is now in continuous daily operation, for the first time makes practicable the extrusion of PTFE rod and tube up to an external diameter of 4 in. PFTE tube of this diameter has a minimum wall thickness of ¼ in., and the standard length in which both rod and tube will be supplied is 3 ft. Other lengths can be supplied to special order, providing the quantity required is sufficient to justify such orders being undertaken. It is impossible to generalise about what is a sufficient quantity, since it depends on the diameter of the tube or rod, and numerous other factors, but the company will provide full information when the nature of a specific requirement is known to them.

In developing this equipment, and the techniques by means of which satisfactory extrusion up to these sizes can be made, Crane Packing Ltd. have had regard to certain idiosyncrasies of the material, notably its 'memory characteristics.' The tendency for PTFE fabrications to return, in certain conditions, to previous basic forms is eliminated by this new extrusion technique. The entire process is conducted under the most strictly applied controls and the uniformity of production is maintained irrespective of the quantity involved. Two grades of the material are supplied in rod and tube form; one is the 'standard' grade, the other a special high grade, possessing exceptionally good electrical properties. In addition to producing a wide range of fabrications in PTFE, the company is also able now to consider more complex applications and by arrangement it will undertake research into new uses of the material on behalf of companies which are interested in developing the design of equipment in which PTFE components may be necessary.

They also announce an entirely new technique for applying PTFE dispersion coatings, and are willing to tender for the application of coatings to moderately large articles. All inquiries should be addressed to Crane Packing Ltd., of Slough, Bucks.

A NEW range of water meters has been developed by George Kent Ltd., Luton, known as the 'Master' range. In 1½, 2, 3 in. (all 10,000,000 Imp. gal.) and 4 in. (100,000,000 Imp. gal.) sizes, they are pipeline semi-positive rotary-piston meters embodying many improvements from recent research. The meters have been designed to meet the needs of the home and export markets for the accurate measurement of water flow at temperatures not exceeding 120° F.

Outstanding features claimed for the meters include: greater discharge capacity for a given size; reduction in weight; improved counter, reading in any desired units; lower head loss; overall accuracy within 2 per cent. and an improved frictionless gland. Meters can be calibrated in Imperial gallons, litres, cubic feet, or any other desired units.

* * *

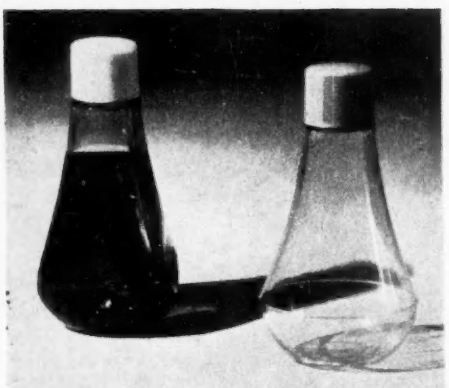
A NEW 12-page technical booklet on ethyl acetate has recently been issued by Carbide and Carbon Chemicals Company, a Division of Union Carbide and Carbon Corporation. The booklet contains information on the uses of ethyl acetate and its physical and physiological properties, specifications, shipping data, and constant-boiling mixtures. Graphs on vapour pressures, specific gravities, freezing points, and other important physical properties are included in the booklet, as well as comparative information on resin solubilities, general solvent properties and viscosity of lacquer formulations. Copies of the booklet are available from Carbide and Carbon Chemicals Company, 30 East 42nd Street, New York 17, New York.

FLEXADUX, PVC flexible ducting for ventilation, fume extraction and dust removal, is a new product of Wilkinson Rubber Linatex Limited of Camberley, Surrey. One of the firm's engineers, Mr. F. W. Raspass, has completed an article on it, dealing more specifically with its use in mine ventilation. Flexadux was developed on the Continent where it is now extensively used. It is a highly flexible ducting which can be collapsed into a very small space. It is rot-proof and age resisting, will not support combustion and has a tensile strength of 3,200 lb. per sq. in. It can be used in temperatures varying from 25° C below zero to 60° C above.

Information from a West German mine where Flexadux has been used showed that its pressure loss was 13 per cent less than that of metal ducting of 500 mm. diameter per 100 m. length. Quantity losses for the metal ducts varied from 5 per cent to 27 per cent, depending on their condition, whereas the Flexadux showed a loss of only 0.5 per cent of the air being passed.

* * *

LACRINOID Products Ltd., Gidea Park, Essex, announce that they are now producing bottles blown from I.C.I. nylon. These bottles, it is claimed, have a remarkable clarity, yet have considerable mechanical strength; moreover, they can be repeatedly sterilised in boiling water or by autoclaving. Although raw material supplies are still limited, reasonable quantities of the bottles can be supplied.



Two of the nylon bottles made by Lacrinoid Products Ltd. The dimpled bottle on the left is filled with rum

THE Association of British Pharmaceutical Industry recently celebrated the 25th anniversary of its formation; from 60 members in 1930 its strength has grown to 183 today. A booklet to commemorate the anniversary gives the history of the Association, which evolved from the first national association of pharmaceutical manufacturers—the Drug Club—and also a short review of the progress made by the industry during the last 25 years. The work of the Association is reviewed against a background of the economic and scientific developments which have affected the industry during that period.

* * *

THE new issue, No. 7 (1954-55), of the *Year Book of the Textile Institute* is now being sent to all Institute members; copies are available to non-members at 15s. each post free. New features include details of the changes in the Institute's design competitions which come into effect this year. Sources from which films on textile subjects can be obtained are listed and addresses of more than 250 textile and allied organisations are given. Details of Standards originated by the Institute's Unification of Testing Methods Committee, several of which have already been adopted as British Standards, and lists of equivalent yarn counts and conversion factors form the 'technical' section of the year book.

* * *

A SMALL handbook issued by A. E. Cawkell, electronic engineers, of Southall, Middlesex, describes sonic and ultrasonic methods of testing engineering materials with particular reference to concrete. The principles of ultrasonic and sonic or electro-dynamic methods are described and details given of the UCT (ultrasonic) and SCT (electro-dynamic) instruments produced.

* * *

DRAVO Counterflo oil fired space heaters are made in this country by the Coventry Radiator and Presswork Co. Ltd., Coventry, under exclusive licence from The Dravo Corporation of Pittsburgh, USA. They are claimed in a brochure recently issued to be particularly well suited to heating warehouses, factories, foundries, machine shops, etc. Their special features, it is said, are simplicity of design and dependability, proper distribution of warm air in the most economical manner, 80 per cent fuel combustion efficiency, maximum safety, compactness and ease of installation.

Law & Company News

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgages & Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages or Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary but such total may have been reduced.)

NORMAN EVANS & RAIS LTD., Manchester, colour and chemical manufacturers.—30 December, two mortgages, to Midland Bank Ltd, each securing all moneys due or to become due to the bank; respectively charged on lands and premises known as Unity Mills, Woodley & Vale Road Works (formerly Upper Bleach Works), Vale Road, Heaton Mersey, with machinery, fixtures, etc., in each case. *£23,567. 26 May, 1954.

TONE PHARMACEUTICALS LTD., Taunton.—31 December, charge, to Westminster Bank Ltd, securing all moneys due or to become due to the bank; charged on a book debt. *Nil. 14 January, 1954.

Increases in Capital

The following increases in capital have been announced: STABILAG CO. LTD., from £3,000 to £11,575; CHARLES LENNIG & CO. (GREAT BRITAIN) LTD., from £20,000 to £200,000.

Company News

British Celanese Ltd.

British Celanese Ltd. have obtained an option on a site at Drum, Aberdeen, so as to investigate its suitability for possible expansion of their manufacturing activities.

Borax Consolidated Ltd.

The American group which wished to obtain control of Borax Consolidated Ltd. has decided to withdraw in view of the action taken by the Borax board. In a letter to the stockholders it explains its reasons. 'Before we could determine the maximum price which we might offer for your stock we required certain relevant information which your directors felt unable to supply,' says the letter. 'Only if this information had been made available to us would we have been able to make an offer for your stock at a fair price. This offer would, we believe, have been at a price appreciably higher than any market price at which it has yet sold and would have given you the opportunity of a continuing interest, so that you might have shared in the future fortunes of the company.

'It was a condition of our offer that Treasury consent be given to the transfer of the company's domicile from the United Kingdom to the USA. Your directors have refused to apply for this consent, although such an application at this stage could in no way have prejudiced your interests and later consideration of an offer.'

International Nickel Company of Canada

The International Nickel Company of Canada has announced a quarterly dividend, payable on 21 March, of 55 cents. Since the third quarter of 1951 the quarterly dividend has been 50 cents.

Quickfit & Quartz Ltd.

The half-yearly interim report of the Triplex group of companies, issued on 4 February, refers to the steady recovery in sales and profits of the subsidiary company, Quickfit & Quartz Ltd. Sales, says the report, are improving not only in the home market but in nearly all countries abroad. Reference is also made to QVF Ltd., formed on 1 December, 1953, as a subsidiary of Quickfit & Quartz and James A. Jobling & Co. Ltd. The report, which covers the six months ending on 31 December, 1954, states that although the company was then only 13 months' old, profits for its first year reached five figures and it shows 'signs of robust growth.'

Food Colouring

The Government is awaiting representations from interested parties before reaching a decision on the recommendations of the Food Standards Committee on the addition to foods of colouring matters, Dr. Charles Hill, Parliamentary Secretary to the Minister of Food, said in a written Parliamentary reply recently.

Next Week's Events

MONDAY 14 FEBRUARY

Chemical Society

Durham: West Building, Science Laboratories, The University, 5.15 p.m. 'Some Naturally Occurring Polyacetylenes' by Professor B. Lythgoe.

SCI (Yorkshire Section)

Leeds: Chemistry Lecture Theatre, The University, 7 p.m. 'Paint and Painting, Current Practice and Trends' by J. H. W. Turner.

TUESDAY 15 FEBRUARY

SCI (Agriculture Group)

London: Chemical Society's Rooms, Burlington House, Piccadilly, 5.30 p.m. 'Recent Aspects of Fertiliser Practice' by B. M. Church and Dr. G. W. Cooke.

Institute of Metal Finishing

London: British Institute of Management, 8 Hill Street W.1, 6.30 p.m. Organic Finishing Group, 'Problems of a Paint Shop Controller' by R. M. C. Logan.

Institute of Fuel

Birmingham: James Watt Institute, Great Charles Street, 6 p.m. 'Fuel Economy and Breweries' by J. Hall.

WEDNESDAY 16 FEBRUARY

Royal Institute of Chemistry

London: Chemistry Lecture Theatre, King's College, Strand, 6.30 p.m. 'Some Recent Advances in Biochemistry' by Professor Sir Charles Dodds.

SCI (Corrosion Group)

London: Chemical Society's Rooms, Burlington House, Piccadilly, 6.30 p.m. Discussion on 'Corrosion Prevention in the Home.'

Institute of Metals

Birmingham: The University, 10.30 a.m. All-day informal discussion on 'The Treatment of Swarfs, Sawings and Residues in the Non-Ferrous Metal Industries.'

Institute of Fuel

Chester: Grosvenor Hotel, 7.30 p.m. 'Relations between the Petroleum Industry and the Government' by V. Butler (joint meeting with the Institute of Petroleum, Stanlow Branch).

Leeds: Hotel Metropole, 2.30 p.m. 'An Approach to Fuel Economy in a large Engineering Works' by F. A. Worsley.

Society of Instrument Technology Ltd.

Sheffield: University Buildings, St. George's Square, 7 p.m. 'The Progress of Temperature Measurement in Industry' by R. Postle.

THURSDAY 17 FEBRUARY

Chemical Society

London: Society's Rooms, Burlington House, Piccadilly, 7.30 p.m. Meeting for the reading of original papers.

Gloucester: Department of Chemistry, College of Technology, 7 p.m. 'New By-products from Coal' by Dr. W. Idris Jones (joint meeting with RIC and SCI).

Manchester: Chemistry Lecture Theatre, The University, 6.30 p.m. 'Immunochemistry' by Professor M. Stacey (joint meeting with RIC and SCI).

Aberystwyth: Edward Davies Chemical Laboratories, 5.30 p.m. 'Some Aspects of Polysaccharide Research' by Professor Stanley Peat.

FRIDAY 18 FEBRUARY

Chemical Society

Glasgow: Royal Technical College, 7 p.m. Annual general meeting, followed by a meeting for the reading of original papers.

Southampton: Chemistry Department, The University, 5 p.m. 'Recent Work on Inclusion Compounds' by Professor W. Baker (joint meeting with Southampton University Chemical Society and Mid-Southern Counties branch of RIC).

SCI (Fine Chemicals and Chemical Engineering Groups)

London: Chemistry Lecture Theatre, King's College, Strand, 7 p.m. 'Some Applications of Chemical Engineering in the Fine Chemicals Industry' by W. C. Peck.

Institution of Chemical Engineers

Manchester: College of Technology, 7 p.m. 'A New Technique for Particle Size Distribution Analysis by Centrifugal Sedimentation' by J. K. Donoghue and W. Bostock.

Society of Dyers & Colourists

Manchester: The Textile Institute, 10 Blackfriars Street, 6.30 p.m. 'The Soiling of Synthetic and Natural Fibres' by G. G. Taylor.

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Pan American Sulphur

Sales Drive in Europe

GUEST Industrials Ltd. have issued in this country a report to the stockholders from the Pan American Sulphur Company, which describes the start of production last September from the new well in Mexico. Estimated production for 1955 should amount to between 400,000 and 600,000 metric tons.

The report says that with a generous area availability of petroleum, natural gas, salt and sulphur, together with rail facilities, labour and ports, the development of a great chemical industry in the Isthmus of Tehuantepec is envisaged.

'The outlook for the sale of our product is satisfactory' the report goes on. 'All during the time our construction programme was going forward in Mexico, we were also engaged in preparing and developing a comprehensive sales programme of world-wide proportions. As the first step in this programme, we made a full and careful analysis of the economics of the world sulphur picture.

'This analysis disclosed that the world is still reacting to the acute shortage of Frasch process sulphur which developed during the period of the Korean War. In fact, this shortage has led the governments of a number of important sulphur importing countries to install much more costly plants for the burning of pyrites.

'We have established direct liaison with the economic experts from each of the major sulphur importing countries at the various embassies and legations in Washington, DC. Through them we were also put in touch with the principal importers of sulphur throughout the world and continuous contact through correspondence has since been maintained with these potential customers.'

The report, which contains pictures of the firm's plant, adds that a visit to Europe by the president and vice-president established personal contacts and resulted in interest in the 'prospect that a new and potentially large source of cheap elemental sulphur is about to take its place in the world.'

Course for Managers

A THIRD residential course for managers in industry is to be held at Madingley Hall, Cambs, from 27 June to 22 July, under the auspices of the Board of Extra-Mural Studies, Cambridge University. The course is intended for managers under the age of 40 who have had some years of industrial experience. It is designed to throw light on the role of the manager and on his personal responsibilities in present-day society, and the course will be 'concerned with those problems which are common to management in all fields and will include a study of those features of our industrial society with reference to which the policies of individual firms must be determined'.

Previous courses, held in 1953 and 1954, were successful, but after consultation between the Vice Chancellor of the University and representatives of industry and DSIR, a consultative committee was appointed to advise on their organisation.

Accommodation is limited to 40. Firms can obtain details from Mr. G. F. Hickson, M.A., Stuart House, Cambridge.

Market Reports

LONDON.—Conditions have shown little change on the week either as regards prices or demand, and the movement to the home consuming industries and for shipment has been well maintained. Materials for the paint industry and for plastics are in strong request and an increasing activity in fertilisers is reported. In the coal tar products market there is a steady request for the cresylic acids and crude carbolic acid, whilst a fairly active demand is reported for the light products.

MANCHESTER.—The demand for textile chemicals on the Manchester market during the past week has been reasonably well maintained, the temporary stoppages at some of the Lancashire mills because of unsatisfactory order books is causing some concern. Other leading outlets for heavy chemicals are calling for steady deliveries under contracts. Fresh inquiries during the past few days have been on a fair scale both from home users and on export account. In the fertiliser section a somewhat better demand has been experienced for superphosphates, and a steady trade continues in most tar products.

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A. BOAKE, ROBERTS & CO., LTD., LONDON, E.15 require **SENIOR CHEMISTS** for their Process Develop, ment Department. These appointments would appeal to qualified men with some years of experience of organic chemistry, seeking the opportunity to lead a team in developing new projects from laboratory to plant scale, so as to provide new or improved products. The minimum salary envisaged is £800 per annum.

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CHEMICAL Engineering Company in Westminster district have several vacancies for **ASSISTANT ENGINEER.** Qualifications are: age about 25-30, B.Sc. standard, good knowledge Physics, Mathematics and Chemistry desirable. Understanding of general office procedure an advantage. The position offers excellent opportunities for a man having these qualifications, coupled with a keen business outlook. Write, stating fullest possible particulars, including age, qualifications and salary required, to **BOX No. C.A. 3383, THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4.**

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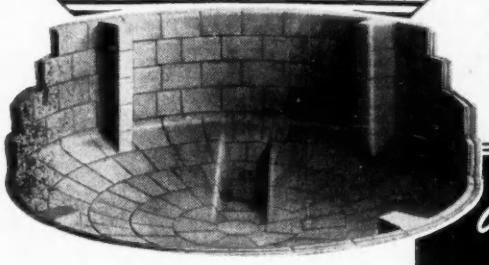

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